DOCUMENT RESUME

ED 195 085 EC 130 862

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| AUTHOR | Schiefelbusch, R. L.; Rogers-Warren, Ann |
| TITLE | Teaching Language-Deviant Children to Generalize Newly Taught Language: A Socio-Ecological Approach. Volume II. Final Report. |
| INSTITUTION | Kansas Univ., Lawrence. Bureau of Child Research. |
| SPONS AGENCY | Office of Education (DHEW), Washington, D.C. |
| BUREAU NO | 443CH80551 |
| PUB DATE | Nov 79 |
| GRANT | G007605086 |
| NOTE | 552p.; Print is poor in parts. For related document, see EC 130 861. |
| EDRS PRICE | MF02/PC23 Plus Postage. |
| DESCRIPTORS | Educational Environment; Exceptional Child Research; *Generalization; Intervention; *Language Acquisition; *Language Handicaps; *Moderate Mental Retardation; Psycholinguistics; *Severe Mental Retardation; *Social Influences |

ABSTRACT

The second volume of a final report on language generalization of severely and moderately retarded and mildly language delayed children is composed of eight appendixes. Introductory information lists project dissemination activities, including published articles and presented papers. Appendix 1 details the two language training programs used in the study (EC 130 861): a functional speech and language approach for severely handicapped persons (Guess, Sailor, and Baer) and a behavioral-psycholinguistic approach (Stremel and Waryas). Observation codes, computer programs, and assessment tests are described in separate appendixes. The bulk of the document is composed of complexity and rate data graphs of individual Ss from the generalization study. Abstracts of ecological studies (including research on increasing language usage during mealtimes); environmental studies (such as research on generalization and maintenance of question asking behavior by severely retarded children); and environmental intervention studies (including papers on teacher-verbal interactions, student activity level and inappropriateness, and environments of language delayed children) complete the volume. (CL)

VOLUME II

Final Report

Grant No. G0076-05086
Project #443CH80551

# TEACHING LANGUAGE-DEVIANT CHILDREN TO GENERALIZE NEWLY TAUGHT LANGUAGE: A SOCIO-ECOLOGICAL APPROACH

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November, 1979

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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Dissemination Activities

## Published Articles

Halle, J. W., Marshall, A. M., & Spradlin, J. E. Time delay: A technique to increase language use and facilitate generalization in retarded children. Journal of Applied Behavior Analysis, 1979, 12, 95-103.

## Published Ch[illegible]

Guess, D., Koegh, W., & Sailor, W. Gene[illegible] of speech and language behavior: Measurement and training tac[illegible] R. L. Schiefelbusch (Ed.), Bases of language intervention. Ba[illegible]e: University Park Press, 1978.

## Papers Presented

Anderson, S. R., & Spradlin, J. E. An analysis of nonverbal classification and productive speech: Acquisition of cla[illegible]abels. Paper presented at the Fifth Annual Convention of the Assoc[illegible]ion for Behavior Analysis, Detroit, June 1979.

Anderson, S. R., & Spradlin, J. E. The generalized effects of productive labelling training involving common stimulus classes. Paper presented at the Fourth Annual Convention of the Midwestern Association of Behavior Analysis, Chicago, May 1978.

Campbell, C. R. Utilizing the rate code as a measure of teacher effectiveness in evaluating teacher-performance. Paper presented at the annual meeting of the American Association for the Education of the Severely/Profoundly Handicapped, Baltimore, October 1978.

Guess, D. Language generalization. Invited colloquium presented at San Francisco State University, May 1979.

Halle, J. W., Marshall, A. M., & Spradlin, J. E. Training spontaneous speech and generalization in the retarded through the use of a single ecological manipulation. Paper presented as part of a symposium at the Fourth Annual Convention of the Midwestern Association of Behavior Analysis, Chicago, May 1978.

Longhurst, T. M. A comparison of developmental sentence scores collected in four situations. Paper presented at the American Speech and Hearing Association meeting, Washington, D.C., Fall 1976.

Longhurst, T. M. Teachers' interrogations to developmentally disabled and nondisabled preschool children. Paper presented at the American Speech and Hearing Association meeting, San Francisco, Fall 1978.

Longhurst, T. M. Teachers' responses to the verbalizations/vocalizations of developmentally disabled children. Paper presented at the Mid-American Linguistics Conference, Columbia, MO, Spring 1978.

Marshall, A. M., Anderson, S., Stremel-Campbell, K., & Campbell, C. R. Strategies for use within training sessions to promote generalization of language skills. Paper presented at the 102nd annual meeting of the American Association on Mental Deficiency, Denver, May 1978.

McQuarter, R., Rogers-Warren, A., & Warren, S. Normal and delayed language development. Paper presented at the 87th annual convention of the American Psychological Association, New York, September 1979.

Paul, L., & McQuarter, R. J. Context factors influencing peer-directed verbalization rates. Paper presented at the Fifth Annual Convention of the Association for Behavior Analysis, Dearborn, MI, June 1979.

Paul, L., & Rogers-Warren, A. A comparative analysis of verbal interactions between normal and language delayed preschoolers. Presented as a poster session at the American Psychological Association meetings, Toronto, Canada, 1978.

Paul, L., Rogers-Warren, A., & Spradlin, J. E. Teaching children to talk to one another. Paper presented at the Fourth Annual Convention of the Midwestern Association of Behavior Analysis, Chicago, May 1978.

Rogers-Warren, A., Warren, S. F., & Owen, M. Measurement and analysis of generalized language usage: A baseline report. Paper presented at the 102nd Annual Meeting of the American Association of Mental Deficiency, Denver, May 1978.

Rogers-Warren, A., Warren, S. F., Stremel-Campbell, K., & Baer, D. M. The assessment and facilitation of language generalization. A symposium presented at the Fifth Annual AAESPH Conference, Baltimore, October 1978.

Spangler, P. F., VanBiervliet, A., & Marshall, A. M. Ecobehavioral strategies for the habilitation of retarded persons. Paper presented at the 87th Annual Convention of the American Psychological Association, New York, September 1979.

Stremel-Campbell, K. Communication intervention with severely handicapped people and development in cognitive and language skills. Paper presented at the annual meeting of the American Association for the Education of the Severely/Profoundly Handicapped, San Francisco, October 1977.

Stremel-Campbell, K. The generalization of signs to nontraining settings. Paper presented at the Fourth Annual Convention of the Midwestern Association of Behavior Analysis, Chicago, May 1978.

Stremel-Campbell, K. Training procedures that affect generalization of trained language behaviors. Paper presented at the annual meeting of the American Association for the Education of the Severely/Profoundly Handicapped, Baltimore, October 1978.

VanBiervliet, A., Spangler, P. F., & Marshall, A. M. An ecological approach for increasing language during mealtime. Poster session presented at the Fifth Annual Convention of the Association for Behavior Analysis, Dearborn, MI, June 1979.

Warren, S. F., & Rimell, P. Increasing questions to retarded children: An analysis of side effects. Paper presented at the Fifth Annual Convention of the Association for Behavior Analysis, Dearborn, MI, June 1979.

Warren, S. F., Rogers-Warren, A., Halle, J., & Paul, L. Prompting generalized language usage: Studies evaluating environmental interventions. Paper presented at the 102nd Annual Meeting of the American Association of Mental Deficiency, Denver, May 1978.

Warren, S. F., Rogers-Warren, A., & Owen, M. Tricks of the trade: The measurement and analysis of complex generalized language usage. Paper presented at the Fourth Annual Convention of the Midwestern Association of Behavior Analysis, Chicago, May 1978.

## Workshops Presented

Longhurst, T. M. Language generalization. Workshop presented to speech pathologists, Educational Service Unit #4, Auburn, NE, December 1977.

Longhurst, T. M. Assessing the role of teacher-student verbal interactions in facilitating language acquisition. Workshop presented to Title I teachers and coordinators, Albuquerque Public Schools, January 1978.

Longhurst, T. M. Language assessment and intervention in the severe-profound population. Workshop presented to speech pathologists, Albuquerque Public Schools, February 1978.

Longhurst, T. M. Language intervention with the moderately-profoundly retarded child. Workshop presented to special education instructors and students at the University of New Mexico, Albuquerque, April 1978.

Longhurst, T. M. Training for language generalization. Workshop presented to TMR teachers and university students, University of Minnesota, Duluth, MN, May 1978.

Longhurst, T. M. Language intervention with the retarded. Workshop presented to speech pathologists and graduate students, Utah State University, July 1978.

Longhurst, T. M. Assessing language in naturalistic environments. Workshop presented to speech pathologists and graduate students, Utah State University, July 1978.

Longhurst, T. M. Assessing and increasing language generalization. Workshop presented to speech pathologists, Educational Co-op, Dodge City, KS, October 1978.

Longhurst, T. M. Assessing and increasing language generalization. Workshop presented to speech pathologists and graduate students, Utah State University, July 1979.

Stremel-Campbell, K. Issues in language generalization. Workshop presented to the Capital Regional Education Center, Bloomfield, CT, April 1979.

Stremel-Campbell, K. Language training and implications for generalization. Workshop presented to the University of Mississippi, University, MS, August 1979.

Warren, S. F. The assessment and facilitation of language generalization. Workshop presented at Orient State Institute, Orient, OH, January 1979.

Warren, S. F. The assessment and facilitation of language generalization. Workshop presented to the North Dakota Speech and Hearing Association, Minot, ND, October 1979.

Warren, S. F., & Rogers-Warren, A. The assessment and facilitation of language generalization. Workshop presented at the Fifth Annual Convention of the Association for Behavior Analysis, Dearborn, MI, June 1979.

## Articles in Press

Anderson, S. R., & Spradlin, J. E. The generalized effects of productive labelling training involving common object classes. AAESPH Review, in press.

Rogers-Warren, A., & Warren, S. F. Mands for verbalization: Facilitating the display of newly-trained language in children. Behavior Modification, in press.

Warren, S. F., & Rogers-Warren, A. Current perspectives in language remediation. Education and Treatment of Children, in press.

## Chapters in Press

Spradlin, J. E., & VanBiervliet, A. Transfer: Behaving effectively in new situations. In J. Hogg & P. S. Mittler (Eds.), Advances in mental handicap research. London: Wiley, in press.

Warren, S., & Rogers-Warren, A. Setting effects on the generalization of noun referents. In K. Kernan & M. Begab (Eds.), The impact of specific settings on behavior and development. Baltimore: University Park Press, in press.

Warren, S. F., Rogers-Warren, A., Baer, D. M., & Guess, D. The assessment and facilitation of language generalization. In W. Sailor, B. Wilcox, & L. Brown (Eds.), New directions in the education of the severely handicapped. Baltimore: Brooks Publishers, in press.

## Books in Press

Rogers-Warren, A., Warren, S., & Stremel, K. Language assessment and facilitation. Baltimore: University Park Press, in press.

## Articles Submitted

Campbell, C. R. Programming "loose training" as a strategy to facilitate language generalization. Submitted to the Journal of Applied Behavior Analysis, September 1979.

Stremel-Campbell, K., & Campbell, C. R. Programming maintenance training as a strategy to facilitate sign generalization to a non-training setting. Submitted to AAESPH Review, September 1979.

## Papers Scheduled for Presentation

Rogers-Warren, A., & Warren, S. Assessing and facilitating language generalization. Miniseminar to be presented at the annual convention of the American Speech, Language, and Hearing Association, Atlanta, November 1979.

Spradlin, J. E. Contrast and integration of two points of view concerning intervention. Paper to be presented at the annual convention of the American Association of Mental Deficiency, San Francisco, 1980.

## Workshops Scheduled for Presentation

Warren, S., Anderson, D., & Marshall, A. The assessment and facilitation of language generalization. To be presented to the staff of the Kansas Neurological Institute, Topeka, KS, November 1979.

## Articles in Preparation

Andersen, D. S. Incorporating usage of nondisabled peer modeling in teachers' interactions with developmentally disabled preschool children.

Boege, J. Syntax of teachers' language addressed to developmentally disabled and nondisabled preschool children.

Brown, P. Responses to vocalization and verbalizations of disabled preschool children.

Elmore, J. B. Quantity and quality of teachers' vocabularies addressed to developmentally disabled and nondisabled preschool children.

McQuarter, R., Warren, S., & Rogers-Warren, A. Normal and delayed language development.

McQuarter, R., Warren, S., Rogers-Warren, A., & Wedel, J. Structured incidental teaching: An analysis of effects on language acquisition by language delayed children.

Rogers-Warren, A., & Warren, S. An analysis of two naturally covarying behaviors: Activity level and inappropriate behavior.

Schraeder, J. A. Teachers' interrogations to developmentally disabled and nondisabled preschool children.

Spangler, P. F., & Marshall, A. M. The unit play manager: A routine for increasing leisure time activities among institutionalized severely and profoundly retarded children.

Sturr, P. Teaching preschool teachers to request and reinforce verbal responses from developmentally disabled children.

VanBiervliet, A., Spangler, P. F., & Marshall, A. M. An ecological approach for increasing language during mealtimes.

Warren, S., Baxter, D., Anderson, S., Marshall, A., & Baer, D. The generalization and maintenance of question-asking behavior by severely retarded children.

Warren, S. F., & Rimell, P. Increasing questions to retarded children: An analysis of multiple effects.

Warren, S. F., & Rogers-Warren, A. The generalization of noun referents by severely retarded children.

## Chapters in Preparation

Rogers-Warren, A., Warren, S., & Wedel, J. Pragmatics and language generalization. In R. L. Schiefelbusch (Ed.).

## Papers Submitted

Warren, S., & Rogers-Warren, A. Current perspectives in language remediation. Paper submitted for presentation at the Piagetian Conference on Child Development, Los Angeles, February 1980.

Workshops Submitted

Warren, S. F., & Rogers-Warren, A. Assessment and facilitation of language generalization. Workshop submitted for presentation at the annual meeting of the American Association on Mental Deficiency, San Francisco, May 1980.

# APPENDIX I

## Language Training Program Descriptions

The purpose of this appendix is to provide more detailed descriptions of the Guess, Sailor, and Baer, and Stremel-Waryas language training programs.

A. Guess, Sailor and Baer: Functional speech and language training for severely handicapped persons

During the late 1960's and early 1970's, numerous experiments were conducted at Kansas Neurological Institute and the University of Kansas in training and acquisition of language skills such as imitation, morphological grammar, syntax, and the relationship between productive speech and receptive language. These experiments demonstrated that speech and language acquisition could be studied and analyzed in the same manner as other human behavior, that severely handicapped children could be taught a variety of rule-governed speech skills, and that the techniques used in training could be effective for an array of the linguistic deficits of the severely handicapped. These investigations provided the basis for a larger, more comprehensive intervention program for nonverbal or seriously speech-deficient individuals.

The task of designing a language development program which can progressively and demonstrably move a child from no speech to modest conversational skill was undertaken with several considerations:

1. The program must emphasize the functionality of speech and language: that is, it must rapidly bring children into contact with the potential of speech as an effective mode of controlling the environment.

2. The structure of the training sequence must emphasize the teaching of skills which allow children to expand their own language repertoire

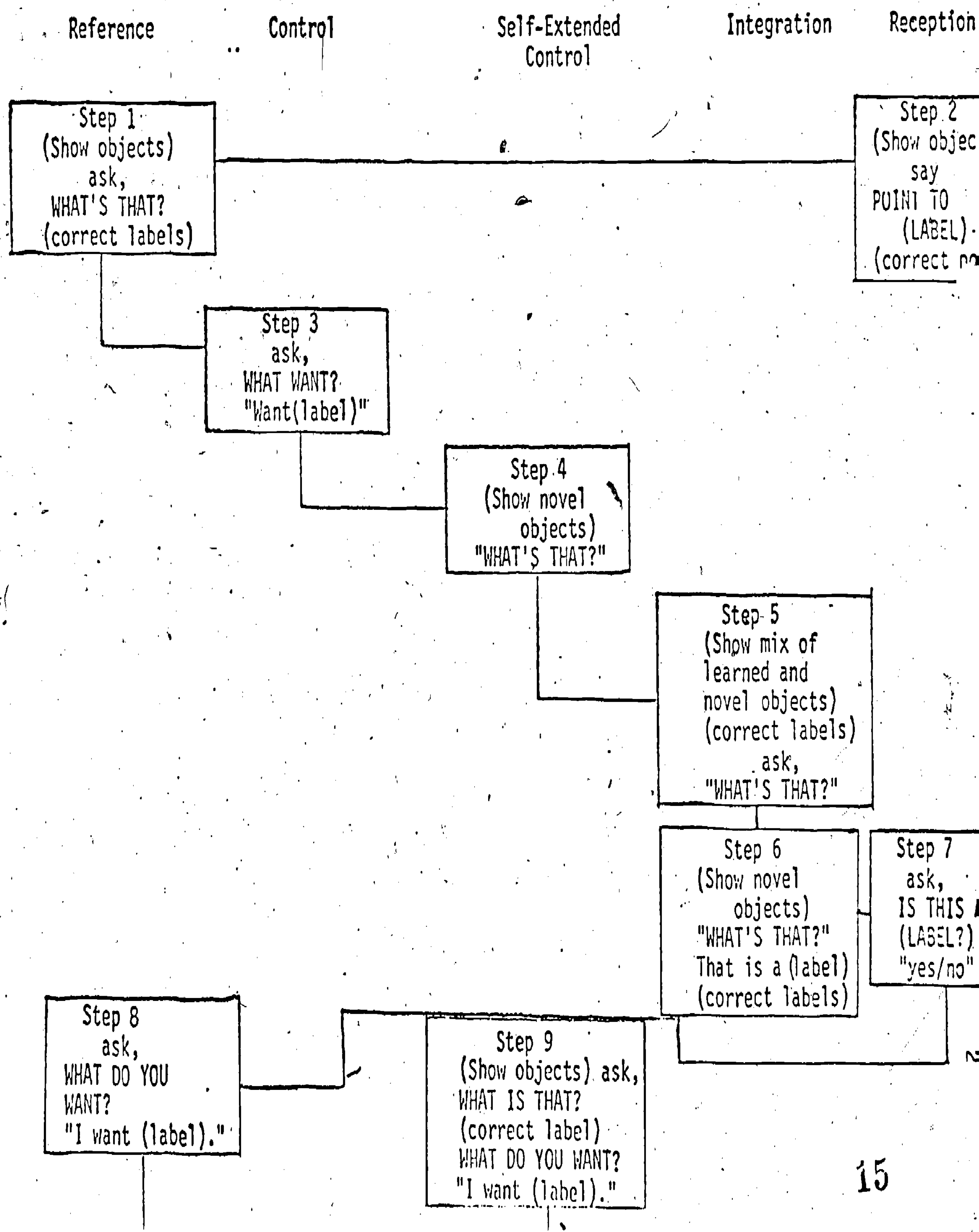
3. The sequence of instruction must allow flexibility in reordering the content areas to be trained, in accordance with ongoing data analysis

The structure of the Guess, Sailor, and Baer program includes an initial assessment and evaluation, a comparison of imitation procedures, and the teaching of functional speech and language skills. This project will concentrate on the part of the program which teaches functional speech and language skills.

This training program is an interlocking sequence of individual training Steps, to be implemented for children (and adults) who have acquired verbal imitation skills. The total sequence is subdivided into six major content areas: 1) persons and things, 2) action with persons and things, 3) possession, 4) color descriptions, 5) size descriptions, and 6) location/relation descriptions. The first content areas trained, Persons and Things, is displayed in the table below. This content area requires 9 steps, each representing various functions taught by the program.

ıle 1

Persons and Things



The sequence of training Steps within each content area is further organized, according to five dimensions: the reference, control, self-extended control, integration, and receptive functions of speech and language.

Reference assumes that the fundamental function of language is to symbolize. This requires a convenient language event which can be responded to, and responded with, in much the same manner as one would respond to or with some real and important event. When the convenient events are words, an immense gain in control of the social world is achieved for the word-user. Word-users may exchange words with each other to manage their mutual interactions, and the exchange of words is much more convenient, and can be much more efficient, than the direct teaching of others to help in dealing with the world. In this program, reference is used in a variety of contexts, ranging from the relatively simple labeling of objects, the description of actions, the identification of ownership (my/your), the attribution of color, and the identification of relational properties (size, position). However, the lesson is only implicit, in teaching these reference skills, that labels are powerful.

The second dimension, Control, makes that power more explicit by teaching request forms of language as a productive skill, such as in the form, "I want [thing], or [action]"; "I want [action-with-thing]"; and "I want you to [action-with-thing]." At the receptive level, Control is used to acknowledge others' questions about the child's wishes, as in saying "yes" or "no" to "You want [thing]?" or "You want [action]?"; "You want [action-with-thing]?"; and, later, "You want me to [action-with-thing]?" Further explicitness about the controlling function of language is added in both the productive and receptive mode through the inclusion of possessive, descriptive and relational properties which further identify the object or action appropriate to the request. Thus, training within the Reference and Control dimensions shows children that, to the extent that they know referents, they can manage their environment. However, after this has happened, children still cannot control their environment sufficiently, because they do not know the necessary labels for the things, actions, and actions-with-things that they need. Thus, it is important in maximizing their use of language to control their environment, that they learn how to remedy their lack of labels. This requires teaching them to request further information in the case of specified ignorances. Thus, a Self-extended Control dimension is added to the program. It is designed to teach the children to request further, specific inputs, based on their discrimination of what they do not know from what they already know.

Self-extended Control is developed by teaching the children to ask questions such as "What (is) that?" in response to unknown things, "What (are) you doing?" in response to unknown actions, "Whose (label)?" in response to identifying ownership of objects, "What color?" when confronted with novel color stimuli, "What size?" to inquire about the largeness or smallness of objects, and "Where [object] or [person]?" to identify or establish location. Obviously, it is important that the children's newly acquired techniques of Self-extended Control (with which they request further instruction about what they do not yet know) be used in a functional manner--i.e., are not only used to invite instruction, but are followed by memory and later use of the instruction given in answer to these requests.

The program contains contingencies designed to make certain that such memory and use actually occur. It is additionally important that language skills taught in Reference, Control, and Self-extended Control are put together so that previously taught skills are integrated with currently taught skills to maximize appropriate interaction with the environment. Thus, the fourth dimension "Integration," calls for training steps to teach the children to discriminate when to seek appropriate information via question-asking, and when to respond with the appropriate referents when the information already exists in their repertoires. A second function of integration is "dialogue" which, conceptually, provides a teaching framework requiring the children to chain together all or some of the previously learned skills, so they can carry on a simple but appropriate conversation centered around a functional activity or theme. The dialogue ranges from a relatively simple two-response chain at the end of the Persons and Things category, to 15-response chains in several of the more advanced categories.

Reception is the final dimension in the program structure. Corresponding to specific attainments in productive speech, concepts are also taught at the receptive level, to make complete the children's ability to speak and listen. The previously described four dimensions have already indicated the interrelationship between production and reception in the training sequence. Thus, for example, a Reference skill taught at the productive level would have a corresponding Reference concept taught at the receptive level. The training of productive skills first in the program, followed by receptive training (if necessary) of the same skill is not intended to minimize the importance of receptive training, but to emphasize the productive nature of the program which, by design, brings the children rapidly into the speaking community (as contrasted to the mute but instruction-following community).

One additional point of importance to the training sequence is the fact that response units are increased both in length and syntactic complexity as the children progress through the steps. Furthermore, the entire sequence is interlocking, so that new skills are introduced as much as possible within the context of previously learned skills. Thus, children are not abruptly exposed to concepts for which adequate prior training has not already taken place. Thus, children are not introduced to later categories and step sequences without having demonstrated that they already possess the skills programmed at earlier steps.

## Structure of the Training Steps

The entire program is presented step-by-step in the published program manual (published by H & H Enterprises, Lawrence, Kansas). Each step in the program manual follows a similar outline which includes the Training Goal, Stimulus Materials Needed, Instruction to the Trainer, and a part on Programming for Generalization.

## Training Goal

This section describes the specific skills or concepts to be trained in a Step, with a brief statement about how the Step is integrated with a previous one.

## Stimulus Materials Needed

The materials and props needed for the procedures are frequently left to the discretion of the trainers whose selection of items can best be made from their knowledge of the students and the living environment in which they reside. For the most part, the training materials include items which are common, readily available and functional. The use of objects as stimulus items rather than pictures is preferred in order to increase the authenticity of the training environment. The initial Steps in the program typically include the following items:

(Food) cookie, pop, apple, candy, gum, juice, crackers, peanuts, milk;

(Toys) ball, car, top, doll, puzzle, block, drum, gun, ring;

(Clothing) pants, dress, shoe, shirt, sock, coat, cap, pajamas, mittens, hat, watch;

(Body Parts) nose, tummy, eye, ear, mouth, foot, chest, arm, leg, knee;

(Miscellaneous) chair, table, T.V., spoon, pan, cup, soap, toothpaste, towel, comb, brush, paper, pencil.

## Instructions

Each Step includes written instructions for the order in which items and trials are to be presented, what the trainer says to the students, and the expected response from the student. The trainer's instructions to the student are always printed in capital letters (e.g., WHAT IS THAT?). The response from the student is enclosed with quotation marks (e.g., "ball"). When appropriate, the instructions also explain how training items are to be arranged for the session, and the position or location of the student in the room.

For each trial in a session, the trainer provides the student with a stimulus, which may be a question, a command, or the presentation of an object or action. The student can give a correct response, a partially correct response, a wrong response or no response at all. The trainer reacts according to the response given. Correct responses are reinforced and praised by the trainer. The trainers are responsible for selecting the types and amounts of reinforcers for correct responses by the student. A considerable effort has been made, however, to construct many steps so that a correct response is <u>intrinsically</u> reinforcing for the student, especially in the higher level Steps in the training sequence.

No student responds correctly on every trial, and some students may require lengthy training before correct responses or even partially correct responses are emitted. The trainer must be prepared to deal with partially correct responses, incorrect responses, or no responses. The various Steps in the manual use one of two basic procedures when the student does not respond correctly. These are the Trainer Correction Procedure and the Second Trainer Modeling Procedure.

The Trainer Correction Procedure (presented in detail in the training manual) describes how the trainer should utilize prompts, put-throughs, and shaping techniques to correct errors made by the students. The Trainer Correction Procedure allows flexibility in reacting to individual, and often idiosyncratic responses made by students, yet the procedure provides a systematic framework which allows the trainer to be consistent and thorough when correcting reponse errors.

There are certain skills and concepts for which a second trainer can best serve as a "model" for the correct response following an error or no response by the student. These situations occur when the concept to be taught involves a reversed discrimination, depending upon the person who originated the response. The concept of "I-You" is a good example. The first person singular pronoun, "I," is used by a speaker, whereas the second person singular pronoun, "you," generally refers to the person or persons spoken to. In teaching "I-You" discrimination, as well as similar concepts (e.g., "my-your"), a second trainer is helpful since this person (whether it be another adult or a student who has mastered the concept) can provide the correctly-modeled answer by assuming the same speaker-listener role of the student. Accordingly, a Second Trainer Modeling Procedure is used in those Steps in the program where a reversed discrimination is taught. (Again, the training manual fully describes the Second Trainer Modeling Procedure).

## Programming for Generalization

Some Steps in the manual have an additional sub-section which describes instructions for extending a newly learned skill or concept to the student's natural environment. Ordinarily, the generalization training procedures are to be administered by the students' parents, parent-surrogates, teacher or other significant persons who have daily contact with the student. The purpose of the generalization procedures is to increase the use of a newly taught skill with persons different from the students' training areas. Additionally, the generalization training procedures assist in keeping other persons aware of the student's progress across time. Thus, by including the child's caretakers as integral parts of the language training environment, parents, child care personnel, and others become familiar with the skills available to the student as he advances through the program so that such skills can be properly attended to (and reinforced).

### Scoring Form and Summary Sheets

Each Step includes scoring forms (data sheets) specifically designed for the training sequence in that Step. The scoring sheets include space for the student's name, the name of the trainer, the date, and session number. Whenever possible, the scoring sheets provide cues for the trainer in administering the procedure for a particular Step. Each scoring sheet includes a summary table for tabulating percent correct responses for each session.

Summary sheets are also provided for each Step to record progress across sessions. Additional space on the summary sheets is used to indicate the date training was started for that Step, the date in which criterion performances were reached, plus the total number of sessions needed to achieve criterion performance.

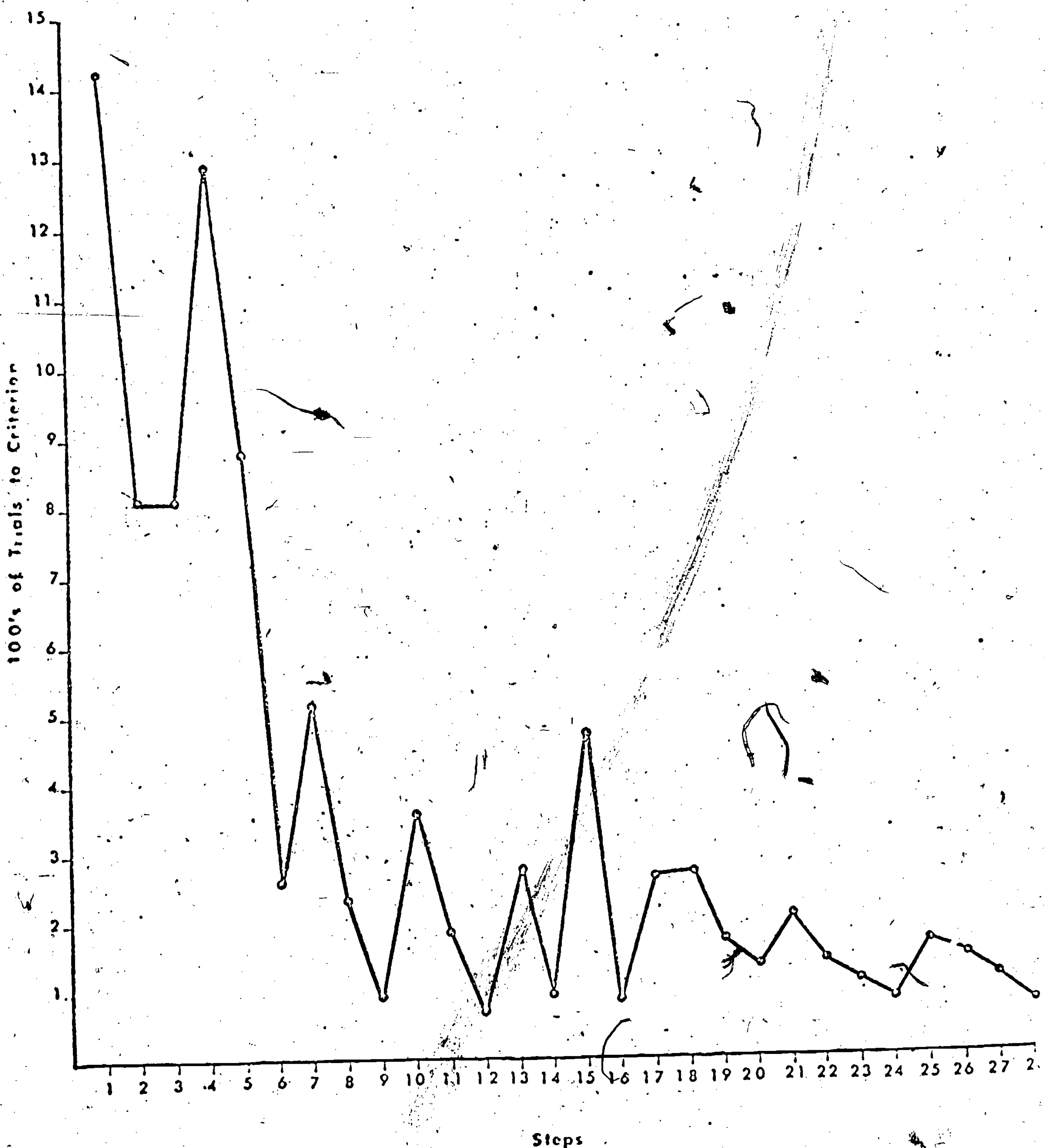
## Evaluation of the Program

There are several major considerations in evaluating this type of speech and language training program. First, do students actually acquire the specific speech and language skills and concepts included in the 60-Step sequence as a function of the training program? Do the procedures and techniques succeed in teaching the student to achieve specified criterion exit levels for each of the training steps? An important and closely related question concerns the rate of acquisition as a student successfully progresses through the sequence. Some preliminary data give strong evidence that severely handicapped and speech deficient children are able to successfully achieve criterion performance on the training steps and, most significantly, criterion performance is achieved in a progressively rapid manner as the student moves through the sequence. These data are derived from a relatively small experimental speech and language training population at KNI, and a much larger field-test population of both children and adults residing in day-care centers and institutional settings in Kansas, Arkansas, and Nebraska.

Figure 1 shows the mean number of trials to reach criterion for each of 28 Steps included in the Persons and Things and Actions with Persons and Things categories. These data are taken from an earlier version of the program which has subsequently been revised into the current training manual. These revisions were undertaken in an effort to further refine some of the procedures in the Steps and to change slightly the sequence of Steps. The data in Figure 1 are based on no less than five and up to 30 subjects who were trained on each of the Steps. The smaller number of subjects per Step are found at the upper end of the sequence. These data show that as students progress through the training sequence, they acquire new speech and language skills more rapidly even though the complexity of the skills taught and the response length of the utterances are both increasing.

Insert Figure 1 here

Mean Trials Across 28 Step



A number of students have now completed the entire 60-Step sequence. Many students now advancing through the functional speech and language training sequence had previously undergone imitation training because they were unable to articulate even the most elemental speech sounds.

There is evidence that severely handicapped students can be trained to acquire the skills and concepts specifically outlined in the 60-Step sequence. The next major question concerns the terminal speech and language status ~~of a~~ child after having progressed through this sequence and, most pointedly, the extent to which the child generalizes to non-trained speech and language skills and to environmental settings different from the training areas--both of which provide the content for analysis in this proposal.

B. Stremel and Waryas: A behavioral-psycholinguistic approach to language training

The language program developed by Stremel and Waryas (1974) presents a series of language assessment tests and training programs for the child who displays delayed or deviant language. The program is not appropriate for the nonverbal child. Rather, it is intended to extend the linguistic structures that a retarded child exhibits. The total program has been divided into three major sections: 1) Early Language, 2) Early-Intermediate Language, and 3) Late-Intermediate Language. In order for a child to be a candidate for this specific program, he must demonstrate specific nonverbal and verbal entry skills. The child is required to display many of the initial behaviors that are trained in the Guess, Sailor and Baer program, such as, vowel and consonant imitation, word imitation, noun production and comprehension.

The Stremel and Waryas program overlaps the Guess, Sailor, and Baer program. Both programs train verbs and a few similar sentence structures, but utilize a different progression of steps. The major objectives of each program also differ. The Guess, Sailor, and Baer program teaches a functional language to nonverbal children with which they can communicate their basic wants and needs. The Stremel-Waryas program expands that functional language system so the retarded child can more closely approximate the linguistic expectations of our society.

Psycholinguistic and behavioral approaches both contribute to the development of this program. Each provided separate input into the program, but frequently complement each other. For example, whenever a series of behaviors is programmed for effective training, the objectives or type of responses should be broken down into small, sequential steps. Knowledge of specific linguistic concepts and structures is necessary for the arrangement and gradual progression of the linguistic stimuli.

The present language program is a series of sequential language programs and assessment procedures for the child who displays delayed or deficient language structures. The individual programs were sequenced according to information from normal language developmental data and data collected in the course of developing the program.

This program is not sufficient for training all children. Each child has to demonstrate a variety of prerequisite behaviors before he is placed in the program. The following sequence lists the entry behaviors for the Early Language Training Program.

Minimal entry behaviors:

1. Gross attending (stays in chair and demonstrates eye-contact).
2. Following simple directives such as "Look," "Sit down," and "Put coat on."
3. Comprehension of at least ten functional nouns.

Preferred entry behaviors (in addition to the above).

1. Attending to stimulus materials and therapist.
2. Imitation of a sequence of finer motor actions (for manipulation of objects).
3. Following directives such as, "Show me," "Point to," and "Match."
4. Comprehension of 25 functional nouns.
5. Consistent (8 out of 10 trials) approximate imitation of a set of phonemes.
6. Verbal labeling (to pictures and/or objects) of at least ten nouns.

The child is placed in the Early Language Training program if he displays the entry behaviors. All of the items are first presented in receptive training if the child does not demonstrate comprehension of the behavior being trained. The program features a concurrent order of training as well as a sequential training.

I. Early Language Training Sequence:

1. Receptive and/or expressive training of an expanded noun vocabulary (may run concurrently with verb training).
2. Verb training (at least 15 verbs are trained before the next training items are presented).
3. Noun-Verb/Verb-Noun (Subj-Verb) (Verb/Object) structures. The object constituent may include a locative "Sit chair," a direct object, "Eat cookie," or an adverb, "run first." Verb-Object structures initially function as request, "Want drink."
4. Noun-Verb-Noun.
    a. Person-affected-State-Object, "I want ball."
    b. Agent-Action-Object, "Girl eat cookie."
    c. Agent-Action-Location, "Boy sit chair."

Once the child has a limited number of NV/VN constituents, these constituents can be combined into additional structures. Additional lexical items can be placed within the constituent structures as the child learns more nouns and verbs.

5. Noun-Verb-Noun. This training task may be trained later depending on the child's articulatory skills.
6. Pronouns.
   a. 1st Person Singular
      Possessive case - "my coat."
      Objective case - "give me"
      Subjective case - "I want that."
   b. 2nd Person Singular
      Objective case - "I give you."
      Subjective case - "You have candy."
7. Adjectives.
   a. Size
   b. Color
   c. Number (if a token exchange is used a few numbers can be presented between #3 and #4).
8. Adjective + Noun, "blue ball" - "big car."
9. Prepositions (in, on, to, with) The prepositions are trained as the N-V-N structure is trained. If the child consistently (50%) omits the Verb in the N-V-Prep-N structure, N-Prep-N training then will precede N-V-Prep training. N-V-Prep-O training.
   a. Preposition + Noun - "on bed" "to house"
   b. Noun + Preposition + Noun - "Girl on chair."
   c. Noun + V(ing) Preposition + Noun - "Girl sit on chair."
10. Particles (Verb + Noun + Particle). "put coat on" or "put on coat."
11. Single word responses to "Wh" questions at approbraite levels:
   a. What (is that) - "ball."
   b. Who (is that) - "boy."
   c. What doing (is N doing?) - "running."
   d. Where (is boy) - "on chair."
12. Question inflections paired with a single-word response should be in the child's repertoire at this time. The child's response should be expanded to a two-, then three-word response during Early-Intermediate training.
   a. "What that?" "What doing?"
   b. "What that?" "What N doing?" - "What boy doing?"
13. Simple form of negation markers on trained structures (may be a gesture or "no" response external to the structure).

The Early Language training program is designed to train the comprehensions and production of: 1) the individual constituents of the basic grammatical relations-nouns and verbs, 2) the verbal and gestural stimuli that control the specific constituent responses, such as the "Wh" questions, 3) the basic grammatical structure (subject-verb-object responses), 4) a limited set of pronouns, 5) a limited number of adjectives, 6) a limited number of prepositions and particles and 7) inclusion of #4, 5, and 6 into the basic grammatical structure.

The table below is shown to provide a sample of the training items for a representative training step, Noun-Verb-Noun (Step 5).

Table 2

Sample Training Items for Noun-Verb-Noun Structure

| Level | Instruction to Child | Response |
|---|---|---|
| Receptive Identification | Show me "boy eat cake." | Child points to one of three choice stimuli |
| Receptive Instruction Following | "Susan, eat cake" or "You eat cake" | Child performs requested action |
| Imitation** | Say "boy eat cake" | Child imitates |
| Production (initial training) | "Tell me about this picture" | "Boy eat cake" |
| Production (generalization probe) | "Tell me about this picture" | "Girl eat cake" |
| Production (generalization training) | "Tell me about this picture" | "Baby eat cake" |

***Imitation may be trained concurrently with either receptive task, or not trained if the child has generalized imitation skills. Imitation might alternatively be used as a first step in production training.

After individual children have met criteria on the Early Language training program, they have the prerequisite behaviors necessary to enter the Early-Intermediate Language training program. Specific training programs in the Early-Intermediate program are also trained concurrently. An outline of the training content for the Early-Intermediate program follows:

Early Intermediate Language Training

A. Entry behaviors:
   The behaviors listed under the Early Language training sequences are considered prerequisite behaviors for the Intermediate Language Training programs.

B. Training sequences:

1. Receptive and/or expressive expansion of noun, verb, adjective and prepositions. (Many novel words can be introduced into the child's vocabulary as language training continues.)
2. Pronouns.
   a. Comprehension of the pronoun is trained first by presenting the gender, human and number features of the pronouns. Objective case pronouns are trained before subjective pronouns.
      1. her, him, it, them.
      2. she, he, it, they.
   b. Production - (gradually incorporate into trained structures).
      1. Objective case - her, him, it, them
      2. Possessive case - her, his, their
      3. Subjective case - she, he, they
3. Articles
   a. Definite and Indefinite singular.
   b. Plural (the + some), the articles are gradually incorporated into trained structures.
4. Negatives - Contractions.
   a. Pronoun don't Verb Noun "I don't have candy."
   b. Pronoun don't Verb Indef. Pron. "I don't want that."
   c. Pronoun (noun) can't Verb Noun. "I can't touch ceiling."
5. Copula /is-are/.
   a. Noun is Adjective - "ball is blue"
   b. Adj. Noun is Adj. - "big ball is blue."
   c. Poss. Pron. Noun is Adj. - "My dress is red."
   d. What is that?
6. Auxiliary /is-are/.
   a. Noun is Ving Noun - "Girl is drinking pop."
   b. Noun is Ving Prep. - Art. Noun - "Boy is sitting on the bed."
   c. What is Art. - Noun doing? - "What is the man doing?"
   d. Where is Pron. Ving? -"Where is he going?".
7. Negative - is + not
   a. Ind. Pron. is not Noun "That is not horse."
   b. Noun is not Adj. "ball is not red."
8. Replacement and expansion of NP within trained structures.
   a. Noun-is-Ving-Pron (D.O.) - "Girl is chasing him." "Lady is stirring the soup."
   b. Noun-is-Ving $\begin{pmatrix}\text{Poss. Pron.}\\\text{Article}\end{pmatrix}$ -Noun "Girl is brushing her teeth." "Lady is stirring the soup."
   c. Pronoun-(aux.)-Ving-Pron (D.O.) "She is chasing him." Branch Pronoun-is-Ving-(Prep)-Noun "He is sitting on bed."
   d. Pronoun-(aux.)-Ving-$\begin{pmatrix}\text{Poss. Pron.}\\\text{Article}\end{pmatrix}$-Noun "He is washing his face." "She is reading a book."
   e. Pronoun-(aux.)-Ving-Prep-$\begin{pmatrix}\text{Poss.Pron}\\\text{Article}\end{pmatrix}$-Noun
      "He is getting on his bed." "She is getting on the bus."

f. (Art. Noun) / (Pronoun) -(aux)-(Ving)- (Poss. Pron) / (Article) -Noun-Particle
(They are putting their clothes on." "She is turning on the light."

g. (Art. Noun) / (Pronoun) -(aux.)-Ving-Noun (D.O.) Prep. Pronoun (IO)
"She is giving pop to him."

h. (Art. Noun) / (Pronoun) -(aux.)-Ving- (Poss. Pron.) / (Article) Noun (D.O.)-Poss. Pron.) Noun-I.D.) Prep.-(Article)- (or pronoun)
"He is riding his bike to the cottage."
"They are taking the books to their room."

i. (Poss. Pron) / (Article) -Noun (aux.) ('not)-Prep. (Poss. Pron.) / (Article) -Noun
"My coat isn't in my room."
"The candy is in your desk."

9. Plurality
a. Noun + morphological marker

Late Intermediate Language Training

The programs in the Late Intermediate Language training program are currently being developed and modified. Specific research projects are being conducted to determine the most effective and efficient sequence.

1. Interrogative reversals.
   a. Copula reversal - "Is it here?"
   b. Auxiliary reversal - "Is he playing?"
   c. Obligatory do, does, did - "Do you like me?"

2. Conjunctions
   a. but
   b. if
   c. because

3. Comparatives.

4. Superlatives

5. Noun/Verb - singular plural agreement

6. Verb tense marks
   a. present
   b. past
   c. future

7. Tag questions

8. Relative clauses

9. Embedded sentences

The content sequence that has been discussed provides a description of the prerequisite behaviors and the behaviors to be trained. Behavior modification procedures are employed to train language content. The procedures will be discussed in terms of assessment, antecedent events, responses and subsequent events.

Assessment

The language assessment is administered after the child has demonstrated the prerequisite behaviors necessary to enter the program. Once the child is placed in the language training assessment, a sample of his spontaneous speech is taken to determine the general area for specific testing. This speech sample is analyzed according to the child's mean length of utterance (MLU) and according to the specific linguistic elements and structures the child displays. This speech sample is taken over several days in order to get a more accurate measure of the child's mean length of utterance. If the child's mean length of utterance is between one and three words, he is placed with the Early Language Training section for specific testing on the early language training behaviors. This assessment test begins with testing the comprehension and production of the Noun-Verb-Noun structures. If the child demonstrates that he has the Noun-Verb-Noun structures, he is assessed on more difficult structures. If the child does not comprehend or produce Noun-Verb-Noun structures he is tested on the earlier developing structures. Ten pictures are presented to the child in this assessment test and the clinician gives several examples of what is required. If the child scores 80% or above on N-V-N structures, he is tested on Noun-Verb structures, Noun-Verb-Preposition-Noun structures and the structures and elements to be trained in the intermediate language stage. However, if the child scores less than 80% correct on the Noun-Verb-Noun assessment, he is assessed on the Noun-Verb-Noun structures. Again, 10 pictures are presented for this assessment both in comprehension and production. If the child scores 80% or above on the Noun-Verb/Verb-Noun assessment, he then goes into training at the Noun-Verb-Noun stage. However, if he scores less than 80% he is assessed on Verbs. Comprehension production and imitation tests are taken at the Verb assessment stage. If the child scores 80% or above on the Verb Assessment, he goes into training at the Noun-Verb/Verb-Noun training stage. However, if he scores less than 80%, training begins on Verbs.

Antecedent Events

Many behaviors are trained concurrently as well as sequentially. For instance, a child is trained on Verbs, Noun expansion and a negative gesture or verbal "No," during the same time period. He is also encouraged to "ask" questions simply by pairing a noun with a rising question inflection. As the child progresses in training the N-V-N structures, questions, and negative structures are trained concurrently. During the final steps of N-V-N training, the child is trained to include negation external to the structure. "No, I want that." Training for the "Wh" questions would include questions such as "Who that?" Later the child is trained to include some of the early developing prepositions within the N-V-N structure. At the same time the child may also be required to include negation internally within the structure, "I no want water," and lengthen his questions by including the noun--"What boy doing?" As the child advances in training and other elements (articles and pronouns) are trained within the basic structure, the child is trained to use contracted negation forms, "I don't want ball," and different "Wh" questions, "Where boy going?" After the child has met criterion for producing articles and pronouns within the Noun-Verb-(Prep)-Noun structure, he is required to use those elements within questions and negation structures, such as "I don't want the red car," "What he doing?" "Where the boy doing?"

The present language program attemps to place children in appropriate groups at the Noun-Verb-Noun stage. At this point it is relatively easy to incorporate the questions and basic structures within the training period. One child can ask another child a question and a reciprocal exchange can occur.

Once the child has been assessed and placed in a specific training program, some basic procedures are utilized throughout training. Specific procedures for certain programs are used when they are applicable. The basic procedures for certain programs are used when they are applicable. The basic procedures consist of: 1) matching or grouping, 2) comprehension, 3) imitation with a referent, 4) production prompts, and 5) production when a directive for a response is given. The first task in training is to establish the correct response and to bring the behavior under the control of a variety of stimuli. If a child demonstrates that he can match specific pictures or actions, and he does attend to the visual and verbal stimuli, training begins with comprehension. Rehearsal behavior is reinforced when the child makes a correct response on a comprehension task. For instance, if the clinician says, "Show me 'him'," and the child points to the correct picture and says ,"Him," he is reinforced for that verbal response. Imitation training follows comprehension training. During imitation training the referent is always presented with the imitative stimulus. The imitative response that is required of the child is usually no more than one word. If the clinician says "What boy doing? - Say boy," the child is reinforced for saying, "Boy sit." After the child has reached criterion on the imitation phase of the program, it is often necessary that intervening steps come between imitation training and production. Specific procedures for certain programs include: 1) gesture prompts, 2) written and visual symbols, 3) phoneme prompts, 4) intraverbal phrase prompts and questions. The last stage of training consists of a directive for a response, "Tell me about the picture." Miniature objects, pictures, real objects, photographs and slides are used as visual stimuli.

Responses

Responses are broken down into small sequential behaviors so the child can be reinforced for correct responding. Precise data of the child's responses are kept in order to analyze the child's error responses. If the child is being trained on Noun-Verb-Prep-Noun structures, he may consistently produce the preposition but omit the verb. In order to introduce effective branching procedures, it is necessary to know the exact type of error response.

The early language training program specifies that one prerequisite behavior is the child's approximate verbal imitation of a set of ten consonants and five vowels at 80% criterion. This provides the clinician with a behavior which is under some degree of stimulus control. As the child progresses in training, the phonemes within specific words are shaped by successive approximation. This is done by initially reinforcing the word the child emits, such as /aʊ/ for "house." Later, reinforcement is provided only for a closer approximation, /haʊ/ for "house," then /haʊt/. Then only correct responses are reinforced. The child is given a token for a closer approxiamtion of a word in addition to a token for the correct language response. "Boy walk to house." If a child is unintelligible after early language training, he may be placed in articulation training for work on a specific phoneme.

Appropriate spontaneous language responses by the child are reinforced by responding to the child in a communicative manner. Prompts and correction procedures are used only if they do not interfere with the communicative process. For example, if a child asks a question in an incomplete form, the clinician expands the question and then provides the answer. Inappropriate responses that interfere with the language responses being trained are decreased by time-out procedures or removal of a token.

Subsequent Events

Positive reinforcement is established for each child during the course of pre-testing and training. Once several reinforcers have been established for a child, a token system is gradually introduced so the child has a variety of reinforcers available to him. The time taken to establish a token system often depends upon the individual child. Some children are initially reinforced only by receiving an edible for each correct response. Since this type of reinforcer reduces the number of responses that can be omitted during a session, the child is gradually placed on token reinforcement. The number of tokens the child must ear before he can exchange them is gradually increased until tokens are only exchanged at the end of each session for pennies, toys, edibles or saved for more expensive items.

Social praise is always paired with the tangible reinforcer. Social praise provides immediate feedback to the child and can be presented more efficiently than tangible reinforcement. The type of social reinforcement should vary so the child does not satiate on "very goods." Differential reinforcement is used to establish and maintain specific linguistic responses. A continuous reinforcement schedule is used when a specific linguistic response is being trained. Immediate feedback on the correct response is given if the child produces an incorrect response. Since the child always hears the next target behavior (the clinician's expansion) after his correct response, it is possible that he may produce the slightly more complex behavior before it is required. If the child produces the next target response prior to receiving training on it, he receives one token for the required response and an additional token for the additional non-trained response. Reinforcement continues to be important long after the child has acquired the specific behavior. Once a linguistic response has been trained to criterion, it is placed on an FR2 schedule in order to maintain it, and the next element or structure to be trained is introduced on a continuous reinforcement (CRF) schedule.

Another subsequent event that follows reinforcement is an expansion. After the child produces a correct response, such as "Boy sit" the clinician reinforces the child, "Good!" and expands to the next step in training, "Boy sit chair." The reponse is expanded only to the next step in the program. If the child begins to use the clinician's expansion in subsequent trials, the child is given an extra token for including the expanded response.

Criteria

The criterion levels for the different program steps were initially established by giving various probes to a group of children to determine approximately the number of correct responses the child needed to produce in order to maintain that behavior and advance to the next step. Adjustment of criterion levels within the program is made when children demonstrate that additional training or branching steps are needed. If a branching step cannot be provided, the criterion level on the preceding step is changed so the child has to produce more correct responses within a fixed number of trials (100% on two consecutive blocks) or produce the fixed number of correct responses within an increased number of trials (90% on four consecutive training blocks).

Throughout most of the program, data are recorded in blocks of ten. A 90% criterion level on any training step means that the child has to make 18 out of 20 correct responses on two consecutive training blocks.

Once the child has met criterion on a specific structure it is reviewed if it is not immediately incorporated into the proceeding training task. When a trained structure is reviewed, the child is no longer reinforced on a continuous reinforcement schedule but is reinforced on a fixed ratio schedule (FR2) where every other correct response is reinforced.

Probes

Several types of probes are taken throughout the program. Probes are administered during a specific program to determine if a training step can be deleted. Probes are taken after comprehension training to determine if imitation training is necessary. Several probes on advanced structures are taken during the earlier training program. For instance, during "N-V-Prep-N" training, the clinician also keeps data on untrained elements the child may produce, "N-Ving-Prep-N" or "N(Pron.)-V-Prep-N." If the child is not producing a "N-V-Prep-N" structure during training, the clinician has probe information that demonstrates that the child is not producing more advanced structures, such as, "N(Pron.)-is-Ving-DO-Prep-IO" structures. If specific elements or structures cannot be probed during the training of earlier structures, probes are taken at various points before the later structure is trained.

If a structure is trained and is not incorporated into a later training structure, it is usually reviewed twice a week. If a previously trained structure is not reviewed, probes are taken to see if the child has maintained the specific element or structure response. Probes are also taken on trained structures after the child has been absent for more than five training sessions.

APPENDIX II

Observation Codes

Instructions for Live Verbatim Recording

1. Record everything the child says exactly as it is said. Do not correct it.

   Examples: subject-verb disagreement: 'the cats is here'
   incomplete sentences: 'sit chair'/

2. Number the minutes (1-15)

3. Using a stopwatch (or the classroom clock if a stopwatch is not available), record the child's utterances in correspondence to the intervals noted above (minutes).

4. An utterance is recorded in the interval in which it began. If an utterance begins in the last second of the first interval, the entire utterance would be recorded in the first interval even though it may have overlapped both the first and second interval.

5. Record child utterances for 15 minutes. If the child leaves the room (e.g., goes to the bathroom), stop recording. Resume recording when the child returns. Do this only when the child leaves the classroom area. Children will frequently move within the classroom, continue recording as they move above.

6. If you cannot understand a word the child says, mark the word as unintelligible (xxx). Listen for inflection and try to determine how many words a child said even if you cannot tell what they were.

   Examples: he xxx me/ (one word unintelligible)
   he is xxx xxx xxx chair/ (three words unintelligible)

   NOTE: Because sentences with unintelligible words usually cannot be included for data analysis, please make every effort to transcribe the word.

7. If you are not sure what the word was, but can make a reasonable guess, mark the word as unintelligible (xxx) then indicate in parentheses the probable meaning.

   Example: he xxx (hit) me/

8. Capitalize only proper names and the personal pronoun 'I'.

9. Do not include commas, question marks, or any other punctuation <u>except</u> apostrophes to indicate contractions and possession.

10. Segment utterances by function (see Context Code).

11. Punctuate utterances with a rising intonational contour (question intonation) with double slashes (//).

    Examples: is he a daddy//
    this one//

12. Indicate all target-child utterances directed to peers or teachers by marking (P) or (T) after the utterance.

    Example: Peer to subject - Hi Susie/
    Subject to peer - hi (P)/
    Subject to teacher - there Susie (T)/

13. When transcribing from the tape recording, eliminate all repetitions of a word or sequence of words which occur together within a particular utterance (<u>disfluencies</u>).

    Examples: (a) Child utters - my my ball/
    Transcription - my ball/
    (b) Child utters - that dog that dog is green/
    Transcription - that dog is green/

14. When the 15 minutes of transcription is completed, check it over. Make sure each word is easily readable by the typist. Check the segmentation (making sure that slashes have been used rather than conventional punctuation). Check to make sure the minutes marked correspond to the recorded utterances.

Barry

# CALCULATING CONTEXT CODE RELIABILITY

## Verbatim

1) Morphemes: Compare the two samples morpheme by morpheme. This means compare each word or root word, each affix, each tense marker, each plural marker,ect.
do not include [illegible] (Or) when preceding [illegible].

a. Mark each agreement '+' and each disagreement '-'.

b. If one observer has marked a word as unintelligible (~~) and the second observer has transcribed the word, do not count this as a disagreement or an agreement.

c. If both observers scored a word as unintelligible, do not count this as an agreement.

d. If one observer has included an utterance and the other observer has not (has not even marked unintelligibles), each morpheme of that utterance is counted as a disagreement.

$$\text{morpheme reliability} = \frac{\text{\# agreements}}{\text{\# disagreements + \# agreements}} \times 100$$

2) Segmentation: Compare each segment for agreement. This requires the notion of "primary" observer. The utterance before each slash mark(s) of the "primary" observation should correspond with an utterance of the "secondary" observation.* Every slash mark(s) of the secondary observation which does not meet the above criteria is a disagreement. If the primary observer has segmented an utterance and the secondary observer has not, the absence of that slash mark is counted as a disagreement.

The number of utterances recorded by the primary observer equals the number of "comparison points" (disageements + agreements). Segmentation reliability is determined by the following calculation:

$$\frac{\text{\# comparison points - \# disagreements}}{\text{\# comparison points}} \times 100$$

* the morphemes on either side of the slash mark(s) should correspond to the primary observation with allowances made for morpheme disagreements.

3) Overall verbatim reliability: Add the ratios of morpheme reliability and segmentation reliability and multiply by one hundred. Retain the ratios of all reliability calculations.

## Segmentation Rules

The stream of utterances pouring from the child should be segmented according to the following criteria:

1) Verbalization boundaries: Generally, falling or rising intonation which occurs at the end of a grammatical unit is a good verbalization boundary marker. Other markers are completed gestures and pauses, with one exception. A pause occurring *within* a grammatical unit ( most likely due to processing or production difficulties) is *not* a boundary marker unless the child does not complete the utterance.

2) Function: This constraint overrides verbalization boundaries to some extent. Vocatives and interactionals will be segmented from the remainder of an utterance if the remainder serves a *different* function. In other words, each verbalization in a transcript will be coded with only one function (with the exceptions of Answer and Imitation).

3) Punctuation: A single slash must follow a verbalization with falling intonation at the end. A double slash must follow verbalizations with rising intonation at the end. Commas must follow the words 'yes' and 'no' if they occur at the beginning of a verbalization (serving one function of course). Use a slash if the word occurs alone.

EXAMPLES :

look/ a monster/*
look at the monster/
look/ I a monster/*
hey/ what is this//*
I want ... to do ... this one/ (pauses)
want to do .../
hey Janet/ can I go in there// *
what is this for// Janet/ *

no, that's mine/ (serving one function)
yes, I did/ " " "
I want cookie/ please/*
hi Billy/
Billy/ Billy/ hi/



* a function difference is the reason for segmentation

CHILD/TEACHER LANGUAGE RATE CODE*

Bureau of Child Research

Language Project Preschool

Steven F. Warren and Ann Rogers-Warren

1976

The purpose of this code is to allow the sequential recording of specific coded teacher verbalizations to a target child, the target child's verbalizations, and specific kinds of consequent events for the child's verbalizations. Not all forms of teacher or child verbalizations, or consequent events are incorporated in the code as it would not be possible to accurately observe and record all types of verbalizations. The types of verbalizations coded here were chosen because they seem most important to a functional analysis of the language ecosystem within which a language deficient child operates. The primary target of the code is to record accurate rates of these types of verbalizations in the exact order in which they occur.

* Copies of this code are available from the authors, Bureau of Child Research Lab, 1043 Indiana St., Lawrence, Kansas, 66045

## Language Code

Child subjects are observed for 15 minutes each day during free play. All child verbalizations, certain types of verbalizations directed to the child, and certain types of events following the child's verbalizations are recorded sequentially.

SYMBOLS:

Verbalizations directed to the child.

- Q - Question
- Q✓ - Yes/No Question
- M - Mand for verbalization
- M - Mand with prompt
- Mf - Mand for form
- I - Instruction for non-verbal behavior
- O - Specific model of verbal behavior

- P - Peer verbalization to the subject; must be combined with symbols shown in left column
- Teacher's code No. - Specifies teacher's verbalization to subject; must be combined with symbols shown in left column.

Child verbalizations.

- I - Initiations
- R - Response to commentary, instructions
- Ob - Obligatory response (to question or model, mand)
- ✓ - Obligatory response required, but not made
- ~~ - Unintelligible

- P - Verbalizations by the subject to a peer; must be combined with symbols shown in left column.
- Teacher's code No. - Verbalizations by the child to teacher specified by code No.; must be combined with symbols in left column.

Consequent events.

- + - Praise for verbal behavior
- - - Negative for verbal behavior
- Im - Imitation (both expanded & partial)
- Cor - Corrective feedback
- C - Commentary
- N - Non-verbal compliance

DEFINITIONS

Child Verbalizations

Initiations (I)

An initiation is any verbalization by the subject which is NOT preceded by a question, a mand, an instruction or a comment. Initiations include spontaneous verbalizations to both peers and adults, the child's speech to his/herself. Imitations and expressive vocalizations (cries, whimpers, singing, etc.) are not considered as initiations.

Examples:

| | | | |
|---|---|---|---|
| Child | (C): | I want some juice | (Score "I") |
| | (C): | Baby, baby | (Score "I") |
| | (C): | What is that? | (Score "I") |

Responses (R)

A response is any verbalization the child-subject makes following a comment by an adult or peer, or an instruction for nonverbal behavior. Responses to mands, models, and questions, and imitations are scored separately (see definitions below).

Examples:

| | | | |
|---|---|---|---|
| Teacher | (T): | Bring it here, Jerry | (Score Instructions) |
| | (C): | No | (Score "R") |

Obligatory Response (Ob)

An obligatory response is a verbalization by the subject which follows a question, mand, or specific model for a verbalization. The response need not be correct to be scored,

but it must be intelligible and appropriate. Appropriate, in this case, refers to the content of the question, model or the mand: the child's response must be of the general content specified by the question or mand. (see examples below).

Examples:

| | | |
|---|---|---|
| T: | What are you doing? | (Record Question) |
| C: | Eating ______ | (Score "Ob") |
| T: | Tell me what it is (looking at cow) | (Score mand) |
| C: | "Horse" | (Score "Ob") |
| T: | Say "cow" | (Score Model (0) ) |
| C: | "cow" | (Score "Ob") |

Obligatory response required, but not made (✓)

If the child-subject does not make a verbal response to a question, specific model, or a mand, or makes an inappropriate response, score a ✓ indicating that an obligatory response was required, but not made.

Examples:

| | | |
|---|---|---|
| T: | What is this? | (Score "Q") |
| C: | (Makes no response) | (Score ✓) |
| T: | Say ball | (Score Model (0) ) |
| C: | (Makes no response) | (Score ✓) |
| T: | What is this? (Looking at cow) | (Score "Q") |
| C: | I want my mommy | (Score ✓) |
| T: | Say ball | (Score Model (0) ) |
| C: | Screams | (Score ✓) |

Unintelligible (〰)

If the child verbalizes, but the verbalization is unclear or not at all understandable, record 〰 indicating unintelligibility. If it is possible to determine the general category of the child's utterance, indicate it in paranthesis.

Example:

T: What do you want? (Score Q)
C: Unintelligible (Score 〰 (Ob) )

Note: Since your rate of scoring intelligibility will probably decrease as you become more familiar with the subject's speech, try to score a category in instances where the adult has accepted the verbalization as appropriate.

Child verbalizations to peers (Score above symbols with P)

If the subject is verbalizing to a peer, as defined by any of the categories of verbalization noted above, record a "P" in combination with the symbol indicating the child-subject's verbalization.

Example:

C: Hi, Kiki. (Score as "I P")
Peer: Say, cat, Barclay (Score as "OP")
C: Cat (Score as "ObP")

Child verbalizations to teachers (Score above symbols with teacher code No.)

If the subject is verbalizing to a teacher, as defined by any of the categories of verbalization noted above, re-cored the teacher code No. in combination with the symbol indicating the subjects verbalization. All teachers should be arbitrarily assigned code numbers by the observer.

Example:

C: Ann, help me. (Score as I.3) (Ann = code No. 3)

VERBALIZATIONS DIRECTED TO THE CHILD

Questions. Any verbalization by an adult or peer in which an expression of inquiry is directed to the subject (by use of his/her name and/or by proximity and face orientation of the person asking the question). Such questions are assumed to require a verbal response.

Example:

T: What is this? (Record "Q")
T: What do you want? (Record "Q")

Questions which require only a yes or no answer, or a head nod, from a subject are scored as Q✓.

Example:

| | |
|---|---|
| T: Is this a ball? | T: Q✓ |
| C: Yes | C: Ob |

Instructions. A request by an adult for the child to perform a nonverbal behavior. Example: Adult to child: Bring it here, Susie. (Score as "I").

Note: Instructions to perform verbal responses are scored as Mands for verbalization.

Mands for verbalization. Any statement to the subject in which the subject is requested to make a verbal reply, excluding questions as defined above, and modeling as defined below:

Example:

T: Tell me what you want (Score M)
T: Tell Shannon you're sorry (Score M)
T: Say it again (Score M)

The use of tell or say with an instruction ("Tell me what you want", or say it again") is always scored as a mand.

Mands with prompts. If the teacher mands the subject and provides additional information to the subject about the choice of correct answers the subject may use, then this should be shown by circling the mand symbol ( M ). Additional information may be provided either by giving the subject a choice of responses to the mand, or by starting the correct response to the mand for the child.

For example:

T: Tell me what you want, the blue one or the red one.
C: The red one — T: M
T: Good — C: Ob
Con: +

Or:

T: Tell me what you want. The rrrr.......
C: The red horse.
T: Good

Mand for form: If the teacher mands the subject and specifies the form which the response must take, then this is a mand for form and should be scored Mf.

For example:

| | |
|---|---|
| T: Tell me what you want, give me a whole sentence. | Mf |
| C: I want the ball. | Ob |
| T: Good | + |

Model for verbal behavior. A demonstration of a verbal response by an adult or peer. Usually modeling will be accomplished by emphasis on the word or phrase by the adult. In addition, when a teacher says "Say" plus some specific word(s), this is also scored as modeling and not as a mand. For example: "Say ball", or "Say the green house". However, "Say your name" would be scored as a mand, not as a model.

Additional Example:

| | | |
|---|---|---|
| T: | "B-A-L-L" | (Score 0) |
| C: | Ball | (Score Ob) |

CONSEQUENT EVENTS

Consequent events are verbalizations, which occur immediately FOLLOWING a child-subject's verbalization with the exceptions of questions, instructions, mands, and models.

Praise for verbalizations (+). A teacher comment indicating approval of a subject's verbal response is scored as praise.

Examples: (All following a child verbalization)

| | | |
|---|---|---|
| T: | Nice talking | (Score as +) |
| T: | Wow, I really could hear that | (Score as +) |

Negative for verbalizations (-).

An adult comment which indicates disapproval of the child's verbal behavior is scored as negative.

Examples:

| | | |
|---|---|---|
| T: | Please be quiet. | (Score as "-" |
| T: | I don't want to hear that again | (Score as "-" |

Imitations by an adult or peer (Im)

Imitations are verbalizations by an adult or peer which immediately follow a subject's verbalization, and include all or part of the preceding child verbalization. Teacher/peer imitations maybe partial, complete or expanded. That is, the imitation may contain only part of what the child said, all of what the child said, or all of what the child said and more. See examples below.

Examples:

| | | |
|---|---|---|
| C: | Ball | |
| T: | A big ball | (An expanded imitation, score as "Im") |
| C: | Ball | |
| T: | Ball | (A complete imitation, score as "Im") |
| C: | I want a ball | |
| T: | A ball | (a partial imitation, score as "Im") |

Corrective Feedback (Cor).

Corrective feedback is a statement to the target-child, immediately following a verbalization, that the content of the verbalization, or the form of the verbalization is incorrect.

Examples:

C: Green

T: No, it's blue.

C: Six

T: That's not right, try again.

Commentary or conversation as a consequent event (C).

Any statement made by a teacher/peer, and not included in the definitions listed above can be scored as a comment following a child verbalization, IF no more than 4 secs elapse between the child verbalization and the adult/peer comment. If more than 4 secs elapse, no score is made.

Example:

C: I want a red one.
T: There aren't any red ones. (Score "C")

Nonverbal compliance by teacher (N).

If a teacher fulfills the verbal request of a child with a nonverbal action, such as presenting a material to the child or completing some task, score an N as the consequent event.

For example:

| | | |
|---|---|---|
| C: | Give me that toy | C: I |
| T: | (Gives toy) | T: N |

Attention: Please add this to your working copy of "The child/teacher Language Rate Code."

Child/Teacher Language Rate Code: ADDITIONS 8/30/76

Echoic Speech (Add to child verbalizations section, P. 5)

Occurrences of echoic speech generally should not be recorded as a child verbalization since this is usually a non-functional speech form. However, with a child who emits this type of speech frequently, it may be desirable to record it in some manner. In such a case, the observer may set up a coding procedure for the behavior in whatever manner is functional for the situation.

Addition to teacher-instruction definition (P. 7)

Another example of an instruction might be of the form: "Lets do it this way, Susie", or, "Lets go". However, a nonspecific comment like, "Lets see", would not be scored as an instruction since its meaning is usually vague.

Addition to the recording rules (P. 13)

When a specific mand, model, question, or instruction is directed to a small group of children in which the target subject is a member, this may be noted by scoring the correct symbol and the adding of a "G". For example, it the teacher said, "Who knows the answer?", the correct coding would be "QG" indicating that the question was directed to a small group of which the subject was a member. If the subject then answers the question, the normal obligatory response code mark would be made. Occurrence of group directed questions should be scored separately from other questions since this situation is considerably different from situations where a question is directly asked of the subject.

Addition to recording rules; redefinition of an Episode (P. 13)

An "episode" will hereby be defined as a period of continuous verbal interaction with no more than 6 seconds of "dead" time occurring between any given verbalization by the child or teacher. Furthermore, the observer should not beginning counting seconds of dead time until a short pause (1-3 seconds) has already occurred in the interaction. Then the observer should count silently him/herself...one thousand one, one thousand two, etc. until he/she has counted to six. If nothing has occurred during this period, the observer should move over one scoring column on the data sheet thus indicating a significant break in the conversation.

## RECORDING RULES

1. Begin by recording the first coded verbalization to the child which occurs after the start of the 15 minute observation period. Next score the child verbalization, and then the consequent event.

| | | | | |
|---|---|---|---|---|
| Example: | T: | What is this? | T: | Q |
| | C: | A horse | C: | Ob |
| | T: | That's right, good. | Con: | + |

**Individual teachers each have an assigned code number. When a given teacher verbalizes to a child, he/she should be identified with the appropriate code number.

| | | | |
|---|---|---|---|
| Example: | Paula says, "What's this" | T: | Q1 |
| | Subject does not respond | C: | ✓ |

Teacher code numbers are: (code no. for Langauge Project Preschool)

1 - Paula
2 - Nancy
3 - Linda
4 - Ann
5 - Aid
6 - Any other adult

2. If the child verbalizes spontaneously (that is, there has been no adult verbalization preceding the child verbalization), begin by scoring the child verbalization.

| | | | |
|---|---|---|---|
| Example: | C: | I want a cookie | C: I-2 |
| | T: | O.K., here | T: C-2 |

3. You score every coded teacher/child verbalization sequentially as they occur. The data sheet is broken up into 50-second intervals. Each 50-second interval contains 14 scoring boxes for teacher verbalizations, for child verbalization and for consequent events. This should be enough for almost any situation. If for some reason it is not, the observer may use some unused part of the data sheet to finish out the recording for that minute. If this occurs it should be clearly marked by the observer.

4. Episodic Coding: The purpose of this code is to record all coded child and teacher verbalizations sequentially, perserving the time relationships between the verbalizations. For this reason, observations with this code should be made using a sequential/episodic method. With this method, episodes of continuous teacher/child verbal interaction are kept separated on the data sheet. An episode is defined as a period of continuous verbal interaction with no more than 4 seconds of "dead" time occurring between any given verbalization by the child or teacher. To indicate episodes, the observer skips an entire scoring block before beginning a new episode.

Example:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T | Q1 | Q1 | M1 | | | | Q3 | | | | |
| C | ✓ | ✓ | ob | | I1 | | ob | | I3 | | |
| Con | | | + | | | | Cor | | N | | |

As time permits, the observer also makes a pencil slash through the open blocks to further differentiate the different episodes.

Examples:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Q1 | Q1 | M1 | / | | / | Q3 | / | |
| ✓ | ✓ | Ob | / | I1 | / | Ob | / | I3 |
| | | + | / | | / | Cor | / | N |

The observer should keep time between verbalizations by counting silently to himself; "one thousand one, one thousand two, one thousand three, one thousand four." A stop-watch should not be used for this since it requires the observer to shift his visual attention form the teacher/child.

5. Record every separate instance of a coded verbal behavior for the child or teacher. For example, if a teacher asked a question, the child failed to respond, and then the teacher immediately repeated the question it would be scored as follows.

| | | |
|---|---|---|
| T | Q2 | Q2 |
| S | ✓ | Ob |
| C | | |

A sample data sheet is provided on the last page of the code.

6. The observer is to watch the target child and record all teacher and child verbalizations that occur during the first 50 seconds of each minute of the 15 minute observation. The last 10 seconds of each minute is considered

"off time" to allow the observer to catch up and get organized for the next minute. Any verbalizations which start before the end of the 50 second "on time" and last into the 10 second "off time" are to be recorded, as are any consequent events for these verbalizations. Any verbalization which starts in the 10 second "off period" but lasts into the next "on period" is not recorded.

7. The following symbols for verbalizations to the child are recorded on the first line of the grid:

Q✓ or Q - questions Yes/No questions
M - mand for verbalizations
M - mand with prompt
I - instruction for nonverbal behavior
Mf - mand for form
O - model for verbal behavior
------
P - in combination with the symbols above, use to denote peer verbalizations to the target child
# - teacher identification number
C

8. The following symbols for child verbalizations are recorded on the second line of the grid:

I - initiations
R - responses to commentary or instructions
Q Ob - obligatory response to question specific model, or mand
Q ✓ - obligatory response required, but not made
~~ - unintelligible
----------------
P - verbalizations by the target child to a peer, used in combination with the symbols above

| | |
|---|---|
| T | |
| S | |
| Con | |

M Ob
O Ob
Q ✓✓ yes/No Question not answered
O ✓
M ✓

9. The following symbols for consequent verbal events are recorded on the third line of the grid:

+ - praise for verbal behavior
- - negative for verbal behavior
Im - imitation
cor - corrective feedback
C - commentary
N - Non-verbal compliance

| | |
|---|---|
| T | |
| C | |
| Con | |

10. The following numbers serve as teacher identification symbols for the teachers they are paired with:

1 - Paula
2 - Nancy
3 - Linda
4 - Ann
5 - Aid
6 - other adults

Reliability suggestions.

The complexity of this code requires added emphasis on observer reliability. This code was successfully used at the Language Project Preschool with 86 percent over-all reliability using a criterion of agreement on exact occurrence divided by agreements plus non-aggreements. Furthermore, reliability figures were calculated for each separate behavioral definition, with averages ranging from 70 to 98 percent.

Because of the difficulty of the code, it is recommended that reliability assessments be taken freqently as long as the code is employed. Furthermore, a large amount of initial training may be necessary before an observer is generally reliable. Practice sessions where observers score

video-tapes can be quite useful since instant feedback is then possible.

Depending on the population observed, some coded behaviors may never be reliability observed. For example, a highly verbal population may make too many responses for the observer to reliabily record all coded behaviors, particularly those which are very low rate. In such a case, these behaviors may have to be dropped from the code.

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# APPENDIX III

## Computer Program Description

This appendix is divided into two sections. In the first section a technical description of our current computer system is presented. The second section contains samples of the information the system currently provides us for each analyzed observation.

## Part 1

## Technical Description

The current system consists of a number of programs and subroutines each with a specific task(s)[1]. Each of the critical programs and subroutines are described below and graphic models are shown to depict how these interact with each other in the course of running data through the overall system.

The first task of the system is to set up appropriate storage areas for data when it is entered (a process called initialization). Two programs, SINIT and CHINIT accomplish this task.

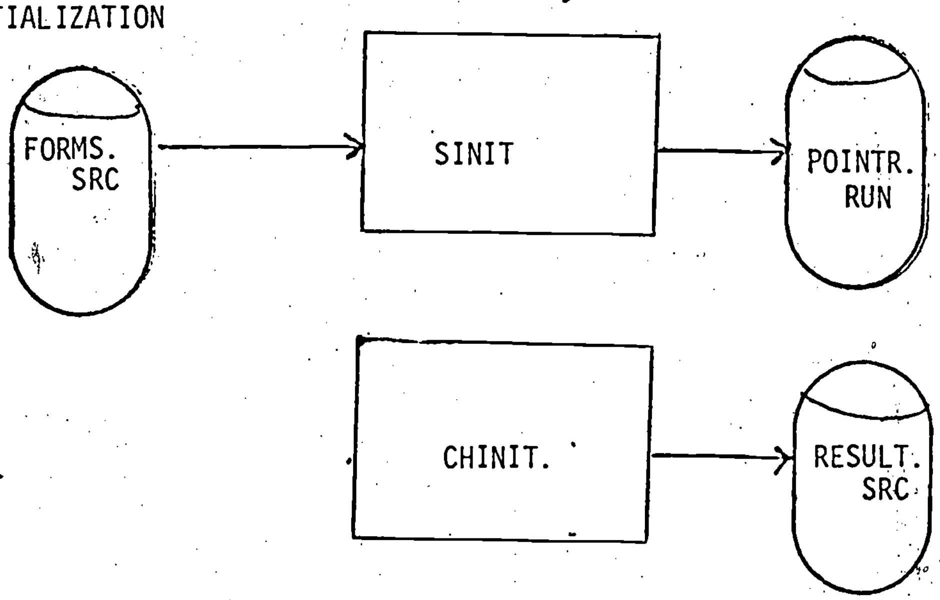
<u>SINIT</u>

This programs sets up the file POINTR. RUN and puts the lists of forms, labels, and headings into records two through six. These lists are used by the PRINT routine to label words and tables. The first record will be used to hold the index for the system dictionary. This program needs to be run only when the forms are changed.

<u>CHINIT</u>

The program initializes RESULT. SCR. It sets up a new file and stores zeroes in the first record. This program is used whenever analysis is started for a particular child or when reanalysis is desired from the beginning.

I. INITIALIZATION




[1] Program labels are shown in all capitalized letters.

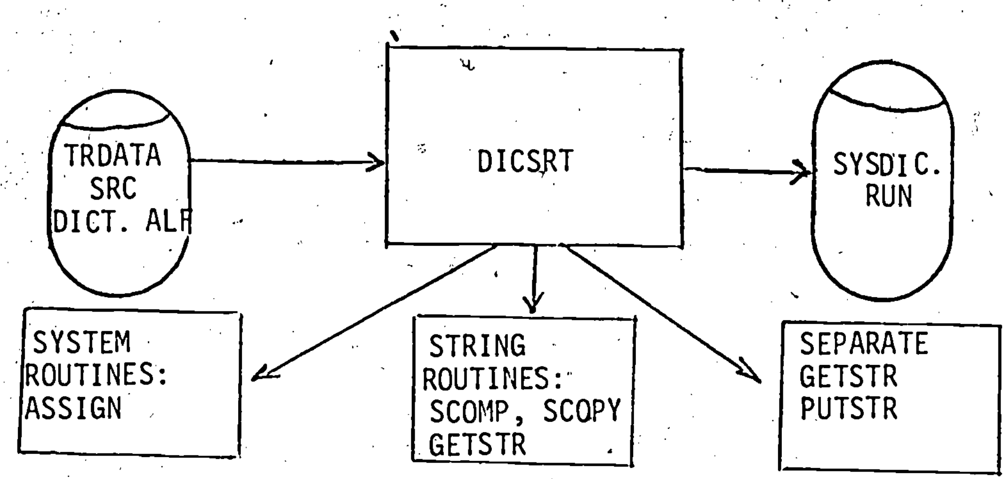
The next task is to "read" the data and make the appropriate changes in the child's dictionary and the overall system dictionary. This is accomplished by the DICSRT program.

DICSRT

This program is used to translate DICT. ALF into SYSDIC. RUN. DICT. ALF is built with the EDIT program and contains records with a word and its part-of-speech separated by a slash. DICSRT reads 32 records at a time, looks up the part-of-speech and translates to integer pointers. It then stores the ASCII characters for the word plus the integer pointers in a 32-byte LOGICAL array. When 32 of these "words" are filled, they are stored as one record of the SYSDIC. RUN file.

An index to the SYSDIC. RUN file is built at the same time. There are three bytes for each record of the dictionary file: 1) the first letter of the first word, 2) the first letter of the last word, and 3) the number of words in that record. This index is used when searching the dictionary, so that only the records that contain the given letter will be searched. This index is stored on the POINTR. RUN file.

This program is run each time the dictionary is changed.




Next the TRANS program is implemented to preprocess any new language training data that has been entered for a child.

TRANS

This program is used to preprocess the training data file, TRDATA. SRC, and build TRDATA. RUN which is used by ANALYZ. Each training data entry contains

1. the date of the training session

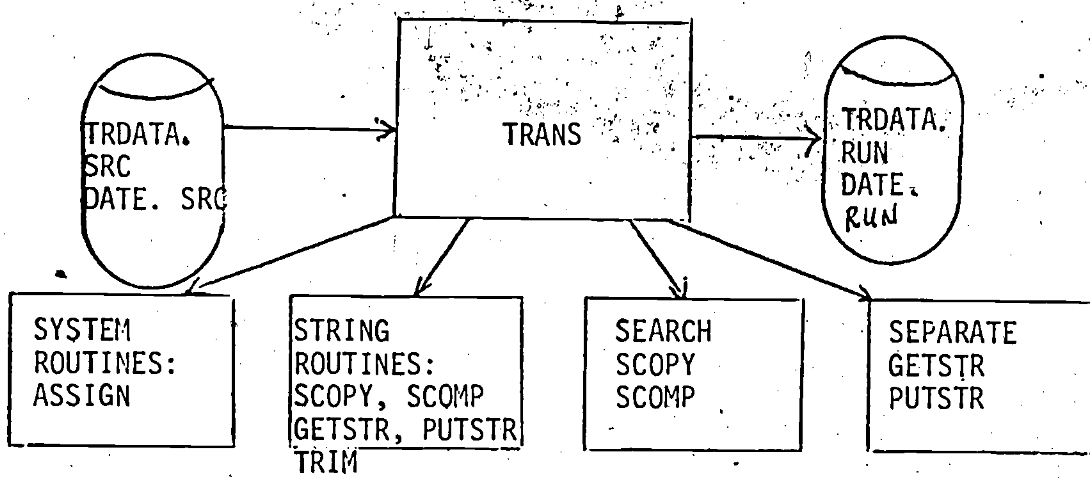
2. the form that was trained
3. the highest level of training for that form on that day
4. the number of new examples the child worked on during the session
5. all the new examples (if there were any).

TRANS checks each of these items against its lists of dates, forms, and levels to make sure there are no mistakes in the entry and if not, it produces a record for the TRDATA. RUN file containing integer pointers for:

1. the date
2. the number of words in the form
3. the form
4. the level
5. the number of examples.

If the number of examples is greater than zero, this record is followed by one record for each word for all examples.

This program is run each time the training data is changed for a given child.




ANALYZ, a system consisting of four major programs, is implemented at this point to conduct the basic syntactic analysis which is the heart of the current system.

ANALYZ

This is a system of four major programs: MONITR which does most of the file set-up, UPDATE which adds the necessary training data, WORDAN which does the word analysis, and SENTAN which analyzes sentences.

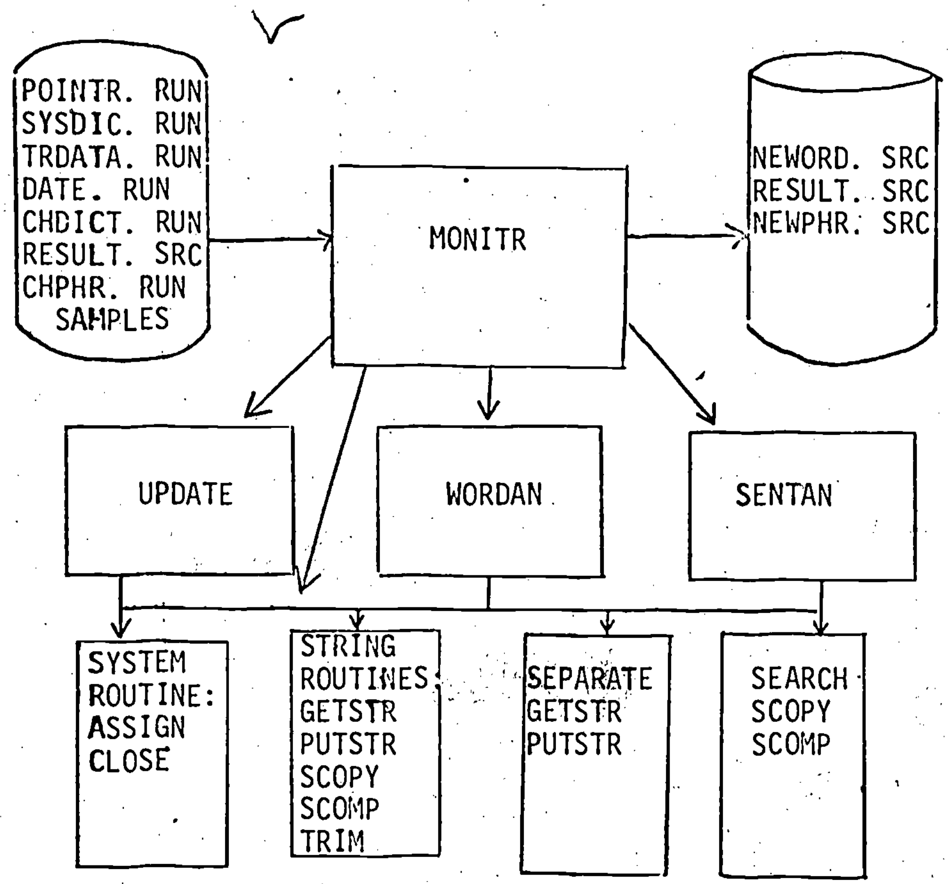
MONITR. This program is the driver for the system. It opens and defines files to be used and carries on the dialogue with the operator. When a sample is completed the results are written onto the appropriate file and MONITR asks if more processing is desired.

UPDATE. After the date of the desired sample is entered, UPDATE is called to add all the training data to the child's summary which was done up to that date. This includes the most recent level for each form, the total number of examples, and all the examples.

WORDAN. This routine is called for each utterance in the sample. The utterance is separated into words and each word is looked for first in the child's dictionary and if not found there in the system dictionary. If still not found the operator is asked to define the word. The part-of-speech information is then recorded. After all the words in the sentence have been defined, each one is checked against the training examples to see if the word has been "trained". After completing this for all words, the appropriate information is entered into the part-of-speech summary (POSUM) under all part-of-speech features for that word. A word is either old (found in previous samples) or new, trained (matches an example used in training) or not-trained, and type (first time in this sample) or token.

SENTAN. This program performs similar functions at the sentence level. First the CHPHR. RUN file is searched to see if the sentence is old or new for this child. Then the sentence type is determined by seeing if the sequence of parts-of-speech match any of the sentence forms which are listed on the TRDATA. SRC file. If so, integer pointer to the sentence form is stored with the phrase. If not, zero is stored. Next the list of training examples is checked if this is a sentence type that has been trained. Finally the SENTSUM is updated to indicate whether this sentence form was old or new, trained or not-trained and type or token. A count is also kept of sentences which were not classified.

SENTENCE ANALYSIS




The results produced by the ANALYZ system are printed next.

PRINT

This routine prints the results that were found by the ANALYZ system. The mainline determines which of the four possible tables are desired and for the summary tables determines what dates are desired.

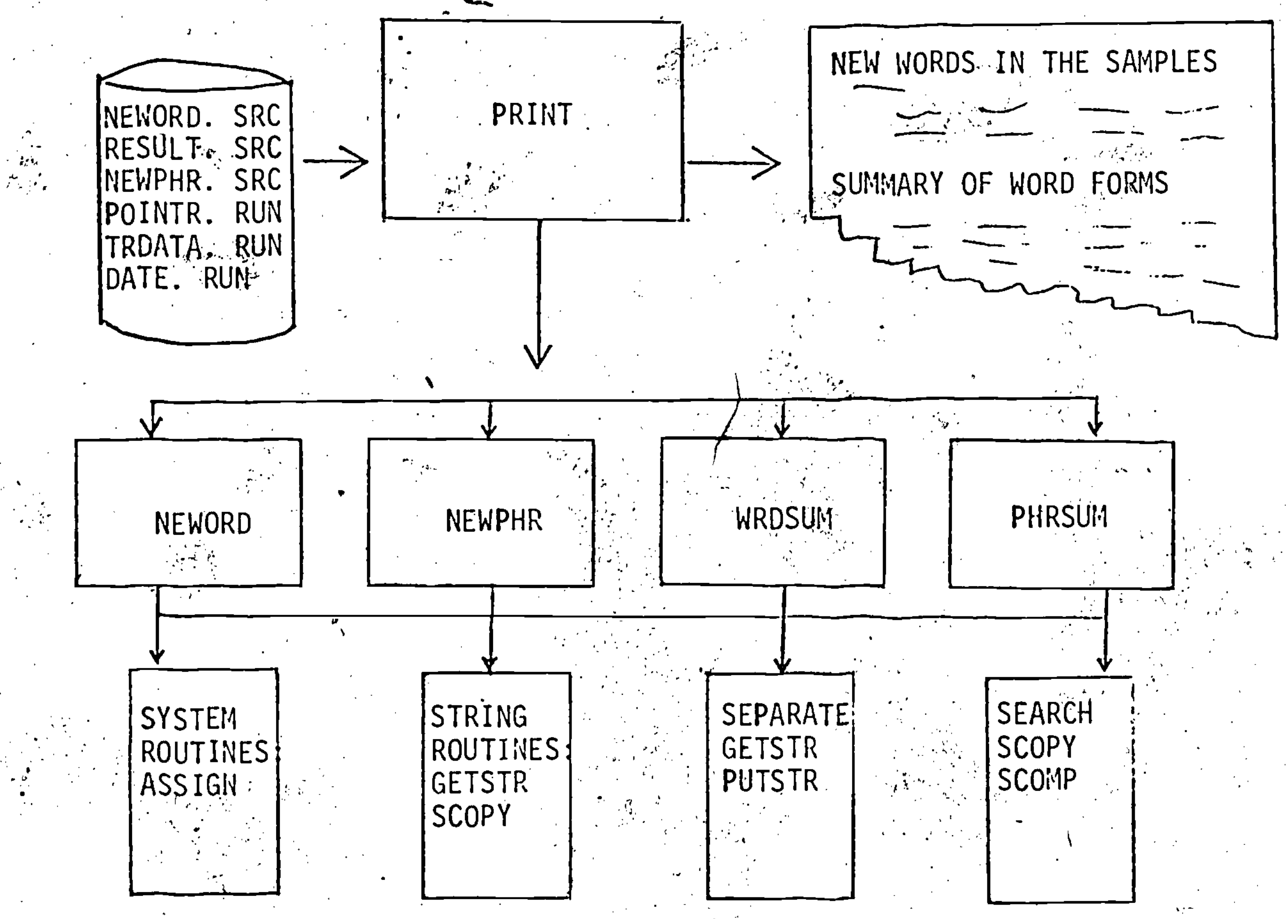
NEWORD. This routine prints a list of all the new words found in the samples just analyzed. The words are grouped by the four major categories: NOMINALS, VERBS, MODIFIERS, and FUNCTION WORDS. The labels for the words are taken from the file POINTR. RUN.

NEWPHR. This routine lists all new phrases found in the current samples. The phrases are grouped by number of words (one-word, two-words, etc.) except that all phrases which were not classified as a sentence type are grouped together (does not include one-word phrases).

WRDSUM. This routine prints the part-of-speech summary. First the four major categories are shown for whatever time period is desired. Each of these categories can then be "expanded" if more detail is desired.

PHRSUM. This routine prints the same information for the different sentence types. First two-word sentence types are printed, followed by three-word, four-word, etc. as long as there are non-zero entries for one of the sentence types. In addition, a summary of the unclassified sentences is given.

PRINTING RESULTS



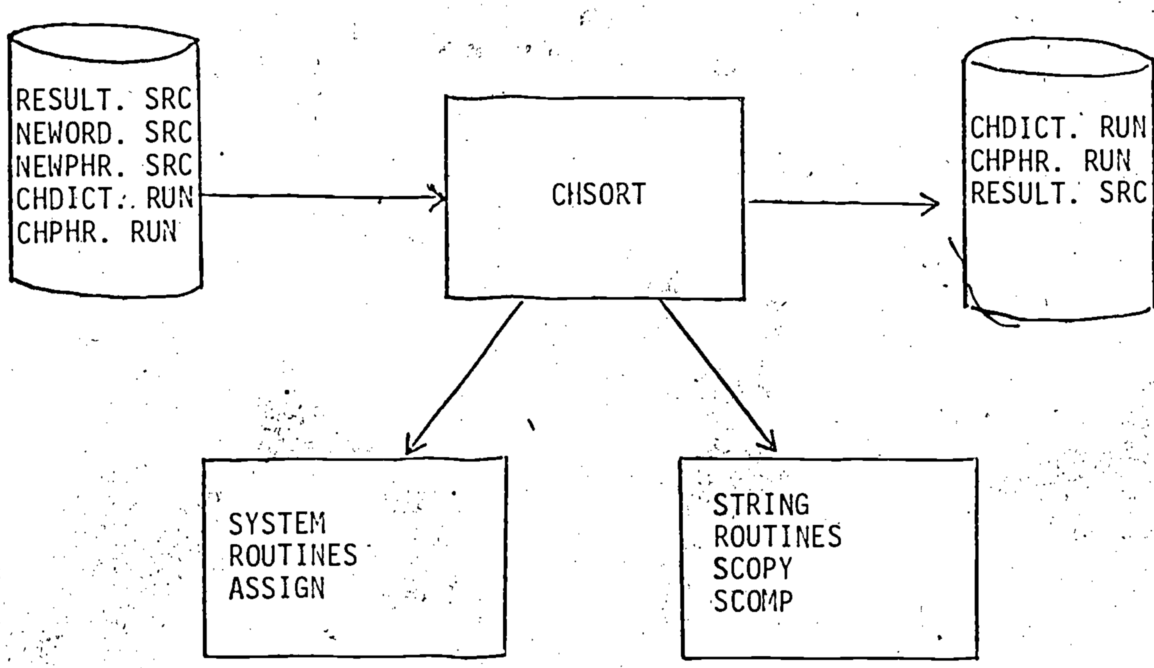

Two other programs of importance to the continuous use of the current system are CHSORT and CHEDIT.

CHSORT

This program sorts all the new words and new phrases and then merges them with the words and phrases in CHDICT. RUN and CHPHR. RUN.

First one record of new words (or phrases) is read in and the new words are extracted from old words. These are then sorted using a "bubble" sort technique. The sorted list is then merged with the CHDICT by reading one record at a time taking all the old words beginning with a particular letter and then all the new words beginning with that letter. As records are filled they are written onto CHDICT. RUN and at the same time a new index to the dictionary is built.

SORTING AND MERGING CHILD DICTIONARY



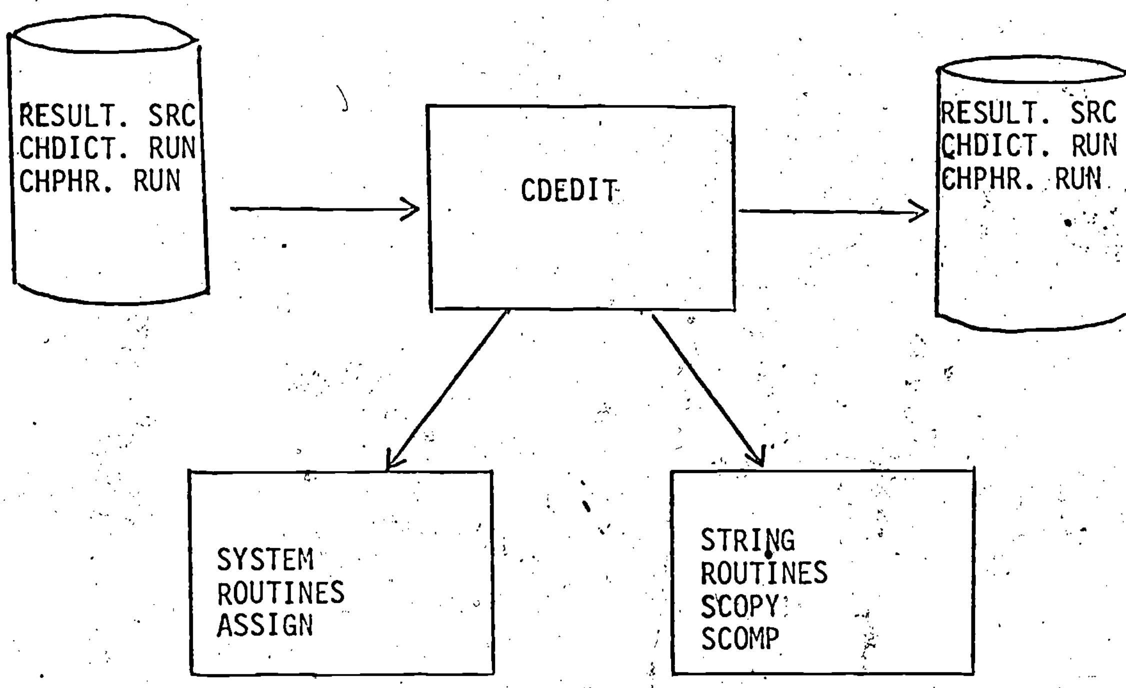

CHEDIT

This program is used to change an entry in the child dictionary or to remove entires back to a certain date.

If the results of an analysis of samples indicate that a word has been defined incorrectly or that a misspelled word has been entered, CHEDIT can be used to correct the child dictionary. The operator enters the word desired and the correct part-of-speech. The word is searched and the entry is corrected and the correct record written back to the file.

If reanalysis is desired from some point other than the beginning, CHEDIT can be used to remove all entries from the child dictionary with dates after a given date.

EDITING CHILD DICTIONARY




Part 2

Output Samples

The following tables are samples of the output from the current computer system. They represent the results for five samples (dates 11-10-76 to 11-17-76) analyzed and summarized together for one child.

DO YOU WANT A LIST OF NEW WORDS? Y

NEW WORDS IN THE SAMPLES

[illegible]SY-U KNI
11-10-76 TO 11-17-76

MLU = 1.68

| | | | | | |
|---|---|---|---|---|---|
| NOMINALS | | | | | |
| MARSHMALLOW | NOUN-COMMON | MALLOW | NOUN-COMMON | MINUTE | NOUN-COMMON |
| THEM | PRO-OBJ | GIRL | NOUN-COMMON | THAT | PRO-DEMON |
| NAME | NOUN-COMMON | JOB | NOUN-COMMON | DAVE | NOUN-PROPER |
| CLASS | NOUN-COMMON | KEN | NOUN-PROPER | BATHROOM(I) | NOUN-COMMON |
| STEVE | NOUN-PROPER | STOMACH | NOUN-COMMON | ROOT(I) | NOUN-COMMON |
| JEFF | NOUN-PROPER | PAPER | NOUN-COMMON | PEANUT | NOUN-COMMON |
| WANDA | NOUN-PROPER | THERE | NOUN-COMMON | PINOCHIO | NOUN-PROPER |
| THIS | PRO-DEMON | CUTIE(I) | NOUN-COMMON | JELLO | NOUN-COMMON |
| BREAD | NOUN-COMMON | TRAY | NOUN-COMMON | DESSERT | NOUN-COMMON |
| VERBS | | | | | |
| COUNT | VERB-AC | TAKE | VERB-AC | 'IS | VERB-COPULA |
| MAKES | VERB-AC | SAY | VERB-AC | IS | VERB-COPULA |
| WALK | VERB-AC | ZIP | VERB-AC | GET | VERB-AC |
| WORK | VERB-AC | SHAKE(I) | VERB-AC | KNOT | VERB-AC |
| EAT | VERB-AC | | | | |
| MODIFIERS | | | | | |
| RED(I) | ADJ-COLOR | QUIET | ADJ | TWO | ADJ-NUMBER |
| ONE | ADJ-NUMBER | RIGHT | ADV | AGAIN | ADV |
| WRONG | ADJ | FIVE | ADJ-NUMBER | SIX | ADJ-NUMBER |
| 'S | PRO-POSSESS | OFF | ADV | TOO | ADV |
| SLOW | ADJ | VERY | ADV | NICE | ADJ |
| FUNCTION WDS | | | | | |
| WHERE | WH-WORD | FOR | PREP | TO | PREP |

DO YOU WANT A LIST OF TRAINED WORDS? Y

WHAT ARE THE STARTING AND ENDING DATES FOR THE TABLE?
11-10-76,11-17-76

TRAINED WORDS IN THE SAMPLES

BETSY-W KNI MLU = 1.68
11-10-76 TO 11-17-76

11-10-76 SPS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| WHAT | WH-WORD | 2 | | | 0 | | | 0 |

11-15-76 DIN

11-16-76 SPS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PEANUT | NOUN-COMMON | 22 | WANT | VERB-ST | 40 | CANDY | NOUN-COMMON | 7 |
| HAT | NOUN-COMMON | 1 | | | 32 | | | 32 |

11-17-76 DIN

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SHOE | NOUN-COMMON | 1 | | | 0 | | | 0 |

DO YOU WANT A LIST OF NEW PHRASES? Y

PHRASES FOUND IN SAMPLES

BETSY-W KNI
11-10-76 TO 11-17-76 MLU = 1.68

PRO V

    THAT 'IS IT    PRO-DEMON VERB-COPULA PRO-OBJ
    WHAT DOES IT SAY    WH-WORD VERB-AC PRO-OBJ VERB-AC
    THAT 'IS GOOD    PRO-DEMON VERB-COPULA ADJ

V-ST N

    WANT PEANUT(TR)    VERB-ST NOUN-COMMON
    WANT CANDY S(TR)    VERB-ST NOUN-COMMON
    WANT PEANUT S(TR)    VERB-ST NOUN-COMMON
    WANT MORE PEANUT S(I)(TR)    VERB-ST ADJ NOUN-COMMON
    WANT PEANUT PLEASE(TR)    VERB-ST NOUN-COMMON OTHER
    WANT CANDY(TR)    VERB-ST NOUN-COMMON
    WANT PUZZLE TOGETHER    VERB-ST NOUN-COMMON ADV
    WANT JELLO PLEASE    VERB-ST NOUN-COMMON OTHER
    WANT JELLO    VERB-ST NOUN-COMMON
    WANT DESSERT PLEASE    VERB-ST NOUN-COMMON OTHER

V N

    WAIT A MINUTE    VERB-AC ART NOUN-COMMON
    WHERE 'IS NAME    WH-WORD VERB-COPULA NOUN-COMMON
    BETSY WHERE 'IS NAME    NOUN-PROPER WH-WORD VERB-COPULA NOUN-COMMON
    WHERE 'IS NAME BETSY    WH-WORD VERB-COPULA NOUN-COMMON NOUN-PROPER
    SAY BETSY    VERB-AC NOUN-PROPER
    WHERE IS NAME    WH-WORD VERB-COPULA NOUN-COMMON
    POP THE WEASEL    VERB-AC ART NOUN-COMMON
    GO POTTY    VERB-AC NOUN-COMMON
    GO POTTY S    VERB-AC NOUN-COMMON
    DO PUZZLE    VERB-AC NOUN-COMMON
    PINCH FINGER S    VERB-AC NOUN-COMMON
    SHAKE HAND S(I)    VERB-AC NOUN-COMMON
    PINCH FINGER    VERB-AC NOUN-COMMON
    KNOT JELLO    VERB-AC NOUN-COMMON

PRO V-ST N

PRO V N

    THAT GOES THERE    PRO-DEMON VERB-AC NOUN-COMMON

WH V-COP PRO-DM

UNCLASSIFIED SENTENCES

    PUZZLE TOGETHER PLEASE    NOUN-COMMON ADV OTHER
    QUIET PLEASE    ADJ OTHER
    TAKE THEM OUT    VERB-AC PRO-OBJ ADV
    TAKE THEM OUT PLEASE    VERB-AC PRO-OBJ ADV OTHER
    TAKE IT OUT    VERB-AC PRO-OBJ ADV
    HAND S DOWN    NOUN-COMMON ADV
    PUZZLE TOGETHER    NOUN-COMMON ADV
    [illegible] GIRL    ADJ NOUN-COMMON
    [illegible]    ADV ADV ADJ-NUMBER

```
COUNT TWO         VERB-AC ADJ-NUMBER
DEAN BETSY          NOUN-PROPER NOUN-PROPER
R.    HERE         ADV ADV
NAME NO XXX XXX XXX        NOUN-COMMON NEG
GOOD JOB          ADJ NOUN-COMMON
MARSHMALLOW PLEASE        NOUN-COMMON OTHER
BETSY 'S        NOUN-PROPER PRO-POSSESS
BETSY PLEASE        NOUN-PROPER OTHER
WHERE 'IS XXX        WH-WORD VERB-COPULA
NO NAME         NEG NOUN-COMMON
NAME BETSY         NOUN-COMMON NOUN-PROPER
NAME XXX BETSY        NOUN-COMMON NOUN-PROPER
SIT DOWN         VERB-AC ADV
GO FOR WALK         VERB-AC PREP VERB-AC
DOWN TO BATHROOM         ADV PREP NOUN-COMMON
ZIP PLEASE         VERB-AC OTHER
COAT OFF         NOUN-COMMON ADV
GO SIT DOWN         VERB-AC VERB-AC ADV
SEE XXX OK         VERB-ST OTHER
FOR YOU JEFF         PREP PRO-SUBJ NOUN-PROPER
XXX BETSY XXX BETSY XXX BETSY        NOUN-PROPER NOUN-PROPER NOUN-PROPER
GOOD M-AND-M         ADJ NOUN-COMMON
NO NO NO         NEG NEG NEG
GOOD BOY         ADJ NOUN-COMMON
GOOD WANDA         ADJ NOUN-PROPER
GET TO WORK         VERB-AC VERB-AC
NO PUZZLE         NEG NOUN-COMMON
PEANUT PLEASE         NOUN-COMMON OTHER
TOO SLOW         ADV ADJ
XXX TOO SLOW         ADV ADJ
TAKE THIS OUT         VERB-AC PRO-DEMON ADV
VERY NICE         ADV ADJ
HAT GO         NOUN-COMMON VERB-AC
XXX HI DAVE         GREET WORD NOUN-PROPER
HI BETSY         GREET WORD NOUN-PROPER
WHAT CUTIE         WH-WORD NOUN-COMMON
DO N'T HURT         VERB-AUX NEG-CONT VERB-AC
DO N'T HIT         VERB-AC NEG-CONT VERB-AC
TAKE IT AWAY         VERB-AC PRO-OBJ ADV

DO YOU WANT A WORD SUMMARY?  Y

DO YOU WANT THE SAME STARTING AND ENDING DATES?
Y
```

HAJOR CATEGORIES

BETSY-W KNI MLU = 1.68

| DATE | SET | NOMINALS tr ing data | NOMINALS number found: not trained old | NOMINALS not trained new | NOMINALS trained old | NOMINALS trained new | VERBS tr ing data | VERBS number found: not trained old | VERBS not trained new | VERBS trained old | VERBS trained new | MODIFIERS tr ing data | MODIFIERS number found: not trained old | MODIFIERS not trained new | MODIFIERS trained old | MODIFIERS trained new | FUNCTION WORDS tr ing data | FUNCTION WORDS number found: not trained old | FUNCTION WORDS not trained new | FUNCTION WORDS trained old | FUNCTION WORDS trained new |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-10-76 | SFS | K/31 | 4/53 | 8/49 | 0/ 0 | 0/ 0 | S/ 2 | 3/ 6 | 6/35 | 0/ 0 | 0/ 0 | */** | 6/25 | 10/35 | **/** | **/** | S/ 1 | 3/15 | 1/11 | 1/ 1 | 0/ 0 |
| 11-15-76 | DIN | K/31 | 3/ 6 | 7/ 9 | 0/ 0 | 0/ 0 | S/ 2 | 8/21 | 2/ 2 | 0/ 0 | 0/ 0 | */** | 2/ 9 | 1/ 1 | **/** | **/** | S/ 1 | 1/ 1 | 2/ 2 | 0/ 0 | 0/ 0 |
| 11-16-76 | SFS | K/31 | 0/31 | 6/ 8 | 2/ 8 | 1/22 | S/ 2 | 7/14 | 2/ 4 | 1/28 | 0/ 0 | */** | 4/20 | 4/ 9 | **/** | **/** | S/ 1 | 4/22 | 0/ 0 | 0/ 0 | 0/ 0 |
| 11-17-76 | DIN | K/31 | 5/11 | 5/18 | 1/ 1 | 0/ 0 | S/ 2 | 9/13 | 3/ 4 | 1/12 | 0/ 0 | */** | 1/ 1 | 0/ 0 | **/** | **/** | S/ 1 | 4/12 | 0/ 0 | 1/ 1 | 0/ 0 |

WHICH FORM WOULD YOU LIKE EXPANDED?
0

DO YOU WANT A PHRASE SUMMARY?
Y

DO YOU WANT THE SAME STARTING AND ENDING DATES?
Y

SENTENCE FORM SUMMARY

BETSY-W KNI MLU = 1.68

| DATE | SET | PRO V | | | | | V-ST N | | | | | V N | | | | | PRO V-ST N | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | tr ing data | number found: not trained | | trained | | tr ing data | number found: not trained | | trained | | tr ing data | number found: not trained | | trained | | tr ing data | number found: not trained | | trained | |
| | | | old | new | old | new | | old | new | old | new | | old | new | old | new | | old | new | old | new |
| 11-10-76 | SPS | */** | 0/ 0 | 2/ 2 | **/** | **/** | E/12 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 | */** | 0/ 0 | 6/12 | **/** | **/** | K/21 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 |
| 11-15-76 | DIN | */** | 0/ 0 | 0/ 0 | **/** | **/** | E/12 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 | */** | 0/ 0 | 3/ 5 | **/** | **/** | K/21 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 |
| 11-16-76 | SPS | */** | 0/ 0 | 1/ 2 | **/** | **/** | E/12 | 0/ 0 | 1/ 1 | 0/ 0 | 6/24 | */** | 0/ 0 | 1/ 2 | **/** | **/** | K/21 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 |
| 11-17-76 | DIN | */** | 0/ 0 | 0/ 0 | **/** | **/** | E/12 | 0/ 0 | 3/ 8 | 0/ 0 | 0/ 0 | */** | 0/ 0 | 4/ 4 | **/** | **/** | K/21 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 |

| DATE | SET | PRO V N | | | | | WH V-COP PRO-DM | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | tr ing data | number found: not trained | | trained | | tr ing data | number found: not trained | | trained | | tr ing data | number found: not trained | | trained | | tr ing data | number found: not trained | | trained | |
| | | | old | new | old | new | | old | new | old | new | | old | new | old | new | | old | new | old | new |
| 11-10-76 | SPS | */** | 0/ 0 | 0/ 0 | **/** | **/** | H/ 1 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 | | | | | | | | | | |
| 11-15-76 | DIN | */** | 0/ 0 | 0/ 0 | **/** | **/** | H/ 1 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 | | | | | | | | | | |
| 11-16-76 | SPS | */** | 0/ 0 | 1/ 2 | **/** | **/** | H/ 1 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 | | | | | | | | | | |
| 11-17-76 | DIN | */** | 0/ 0 | 0/ 0 | **/** | **/** | H/ 1 | 0/ 0 | 0/ 0 | 0/ 0 | 0/ 0 | | | | | | | | | | |

```
STOP --

.R PIP
*DX1:/S
^C

.R CHSORT

STOP --

.R PHSORT

STOP --

.R PIP
*DX1:/S
*DX1:*.RUN/L
30-MAR-78
DATE   .RUN    4 30-MAR-78
TRDATA.RUN    18 30-MAR-78
CHDICT.RUN    10 30-MAR-78
CHPHR .RUN    14 30-MAR-78
4 FILES, 46 BLOCKS
 105 FREE BLOCKS
*DX1:NEWCRD.SRC/D
*DX1:NEWPHR.SRC/D
?FIL NOT FND?
*DX1:NEWPHR.SR/D
?FIL NOT FND?
*.SRC/L
-78
```

# APPENDIX IV

## Assessment Test Descriptions

The four assessment tests to be given to the experimental subjects are each reviewed in detail. Each test will be given every six months to each experimental subject.

PEABODY PICTURE VOCABULARY TEST

VOCABULARY-COMPREHENSION

Author: Lloyd M. Dunn

Publisher: American Guidance Service, Inc.
Publishers Building
Circle Pines, Minnesota 55014

Age Range: 3-3 to 17-6

Date: 1965

Administration Time: 10-15 min.

Purpose: The PPVT is designed to provide an estimate of a subject's verbal intelligence through measuring his hearing vocabulary.

Description

Procedure. Directions to the testee should be read verbatim. Directions are provided in the manual for children below and above 8 years of age. The examiners should be careful not to let the subject see the printed words, to use them in sentences, to define or spell them. The examiner should never precede the word with an article or convert singulars into plurals. Praise should be given generously during the test to keep the subject motivated. The subject can use an oral pointing or yes-no response. The subject should be encouraged to guess if he won't respond and he may change a response if the change is spontaneous. Introduce the testing using the examples provided in the test manual then proceed to the plate where it is suggested to begin for the subject's chronological age. The examiner must find a basal of eight consecutive correct responses and a ceiling of six errors in eight consecutive responses. To record responses, write the picture number on the score form. To establish easily the basal, ceiling and errors, indicate incorrect responses by drawing a line through the geometric figures.

Scoring. The raw score (number of correct responses) is derived by subtracting the errors from the last item presented. The raw score is converted to three types of derived scores, 1) mental age, 2) intelligence quotient, and 3) a percentile equivalent.

Reliability. Wide ranges of ages among subjects tend to inflate correlations and using subjects falling within a narrow range on the intellectual continuum tends to reduce correlation. The studies are done before 1965 (which are in the manual) indicate satisfactory coefficients of equivalence and temporal stability for both average children and those with disability.

Validity. Measures were obtained both for individual items and for the total test. Studies indicate that the PPVT is not providing a comprehensive measure of intellectual functioning. There are the highest correlations with instruments most comparable to the PPVT and lowest with performance intelligence tests. It measures vocabulary and correlates highly with verbal IQ measures. Studies indicate the PPVT should be a better predictor from Grade 3 and on.

Norms. The PPVT was standardized on 4,012 cases, divided among different age levels. Both forms were administered by four examiners. Not less than 3 nor more than 7 days elapsed between administrations.

Comments. Since responses are non-oral it is appropriate for speech impaired or handicapped individuals. It is quickly administered, covers a wide age range and the alternate forms of the test allows one to repeat measures. The pictures have clean bold line drawings but are small with four on a page. PPVT scores are often misused and aren't always valid.

SKI-HI RECEPTIVE LANGUAGE TEST — SYNTAX-COMPREHENSION

Authors: Thomas M. Longhurst
Deb Briery
Mary Emery

Publisher: Unpublished, available from:
Dr. Tom Longhurst
Speech Department
Kansas State University
Manhattan, KS 66506

Age Range: Approximately 2-5 yr. Date: 1974

Administration Time: Variable, approx. 10-15 min.

Purpose: To probe the handicapped child's ability to comprehend single word utterances as well as two, three, and four word utterances. It is intended to be readministered at three month intervals throughout the child's language development.

Description

The Ski-Hi was developed for use with young hearing impaired and deaf children. It tests 100 core vocabulary items divided into five "critical element" categories in conceptual groups such as clothing, foods, farm animals, etc. Comprehension of two, three, and four critical elements is also tested.

General Procedure. The child is informed that he is going to play a game and that he must use his finger to point. The child is then instructed to "Look at all the pictures," and then to "Point to ____" or "Show me ____." If the child does not respond appropriately, model the response for him. The responses to the training items must be correct before proceeding to Part A. If the correct response is not obtained, try again in the next testing session.

Procedure PART A. Consists of 100 core vocabulary items. There are 20 plates with five pictures per plate. Categories tested include agents (animate nouns), objects (inanimate nouns), actions (verbs), attributes (modifiers), and relations (prepositions). All of the pictures on one plate belong to one conceptual category, such as body parts, etc. Present three items per plate. When the category is completed, go back and test the remaining two items on each plate. If the child fails, but you suspect comprehension, duplicate the plate(s) using real objects. Fifty percent of the agents and objects must be correct before proceeding to the actions. Fifty percent of the actions must be correct before proceeding to the attributes, and fifty percent of the attributes must be correct before testing relations. The total score for Part A must be seventy percent before beginning Part B.

Scoring PART A. Place a + or a - in the blank by the word on the record form. Figure the percentages for each category in the spaces provided. Record the percentage for each category on the data sheet.

Procedure PART B. Consists of two element items. The following combinations are used: agent + agent; agent + action; and attribute or object + agent. There are 10 plates with four pictures per plate, and one response per plate.

Scoring PART B. Circle the number on the answer sheet that corresponds to the picture the child pointed to. Figure the percentage for Part B on page one of the response sheet, and enter the percentage in the graph on the data sheet.

Procedure PART C. Consists of three element items. There are 10 plates with four pictures per plate and one response per plate. The following combinations are used: agent + relation + object; attribute + agent + action; agent + agent + action; and agent + action + object. Scoring is the same as Part B.

Procedure PART D. Consists of four element items. There are 10 plates with five pictures per plate and one response per plate. The following combinations are used: agent + action + attribute + object or agent; agent + action + relation + object; attribute + attribute + agent + action; agent + agent or object + relation + object; and attribute + object or agent + relation + object. Scoring is the same as Part B.

Readministration. The test was designed to be readministered periodically. There is a score form to record each readministration. When readministering, begin with some success items from the last readministration. Then probe the items that were failed, and then probe new items.

Reliability and Validity. No reliability or validity data are reported.

Norms. Since the test is designed to assess language change in a single child across time no normative data were included with the test.

Comments. The test plates for the Ski-Hi are very large and mounted on heavy cardboard. The pictures are colorful and present a cartoon-like appearance. Young children seem to enjoy taking the test. Since there are 100 core vocabulary items, it is possible to identify specific areas of strength and weakness in a given child. The data sheet used to record total percent correct in the five categories of Part A and for Parts B, C, D allow the examiner to chart progress of the child across successive test administrations.

TEST FOR AUDITORY COMPREHENSION OF LANGUAGE (TACL) MORPHOLOGY & SYSTACTIC-COMPREHENSION

Author: Elizabeth Carrow

Publisher: Learning Concepts
2501 N. Lamar
Austin, Texas 78705

Age Range: 3.0-6.11 yr.

Date: 1973

Administration Time: 20 min

Purpose: To measure the auditory comprehension of language structure.

Procedure. The Test for Auditory Comprehension of Language is designed for administration in a one-to-one setting. The test booklet is placed with the illustrations facing the child and the stimuli to be read aloud facing the examiner. No language expression is required of the child; he points to the correct picture in the test booklet in response to the examiner's verbal stimuli. His responses are recorded on a separate scoring sheet rather than in the test booklet itself.

Scoring. Each correct response is given one point and the total raw score is the sum of these points. The total raw score may be converted to an age score or may be used to compare a child's performance with that of other children by using measures of central tendency. Normative data for this test can be found in the TACL manual.

Comments. This is a popular test that is well constructed and standardized. It is one of the most complete tests of its classificaiton.

# APPENDIX V

## Complexity and Rate Data Graphs from the Longitudinal Analysis of Generalization

KNI Data

Subject: S.C.

Site: KNI

Figures 1 through 5

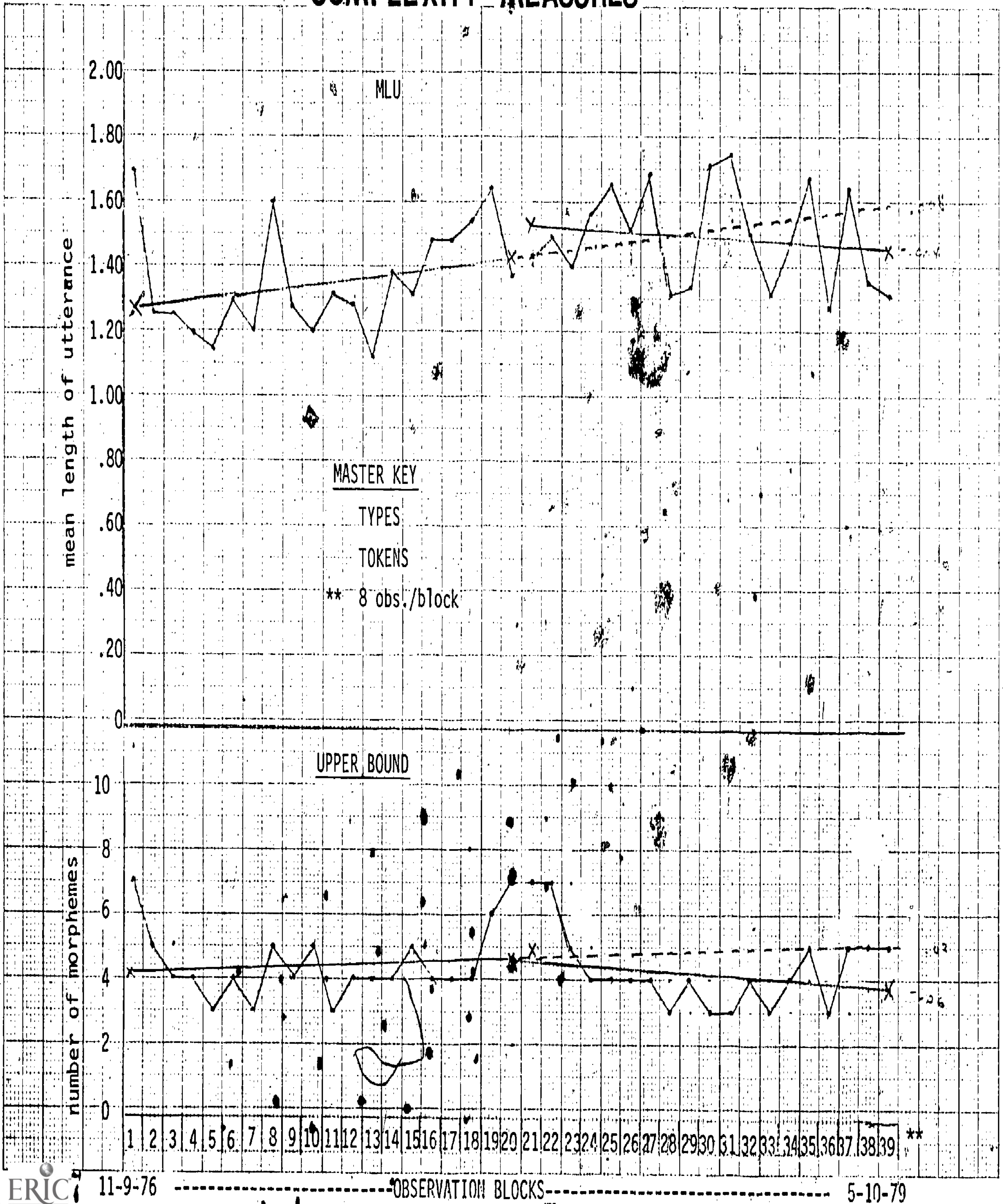
SUBJECT: SC

Figure 1

SITE: KNI



# COMPLEXITY MEASURES

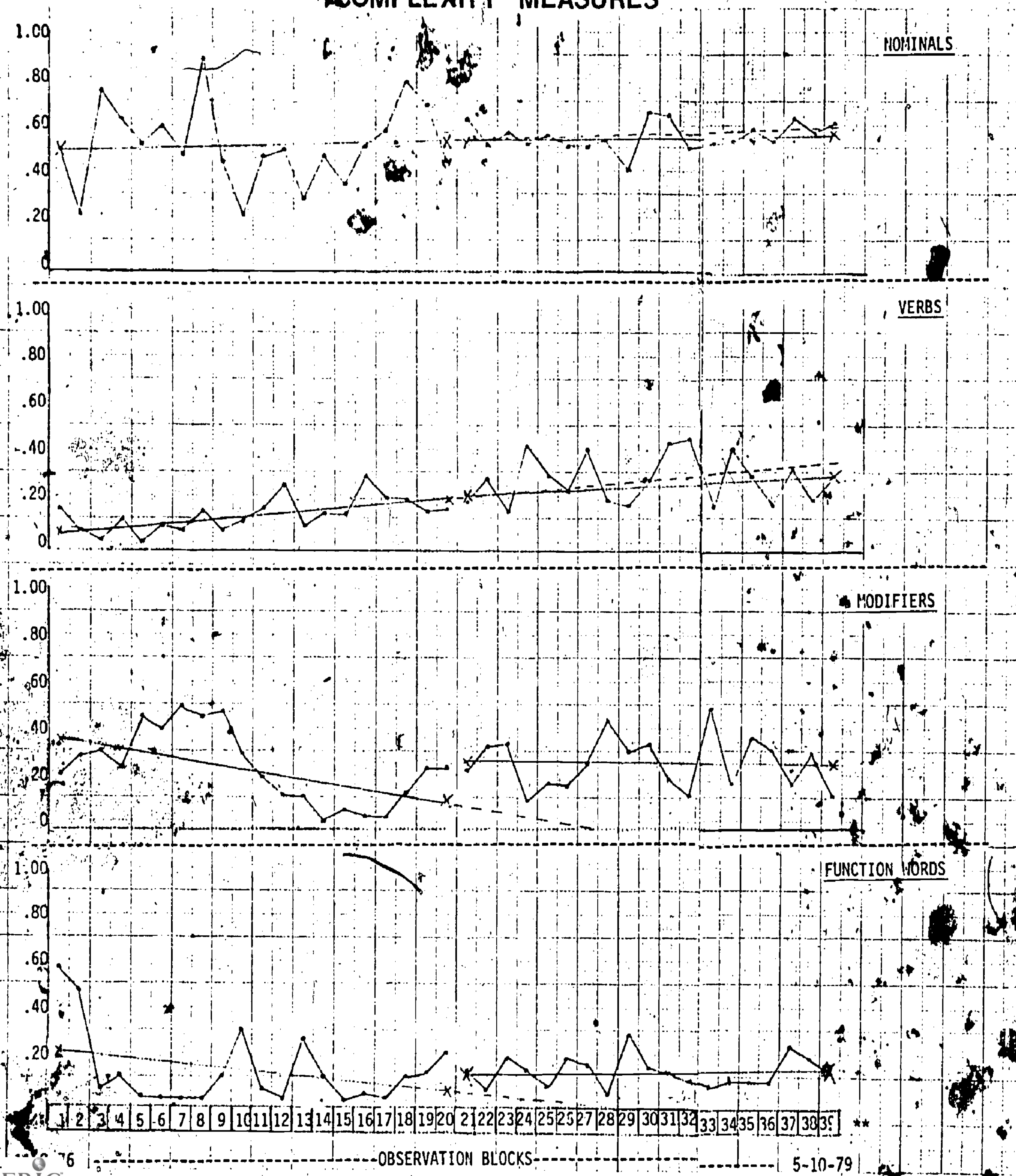


SUBJECT: SC

Figure 2

SITE: KNI

COMPLEXITY MEASURES



subject: SC Figure 3 site: KNI

MAJOR CATEGORIES

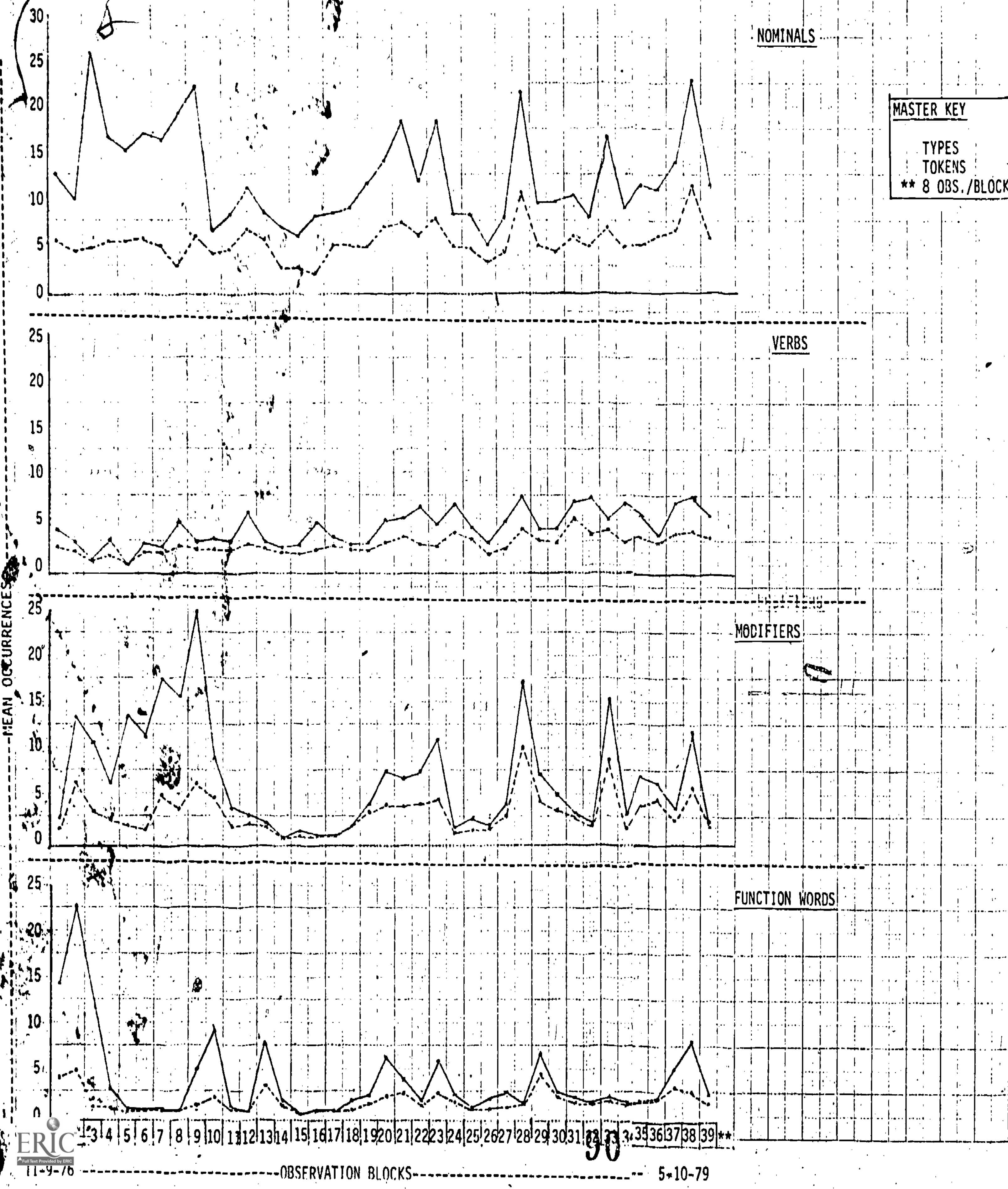
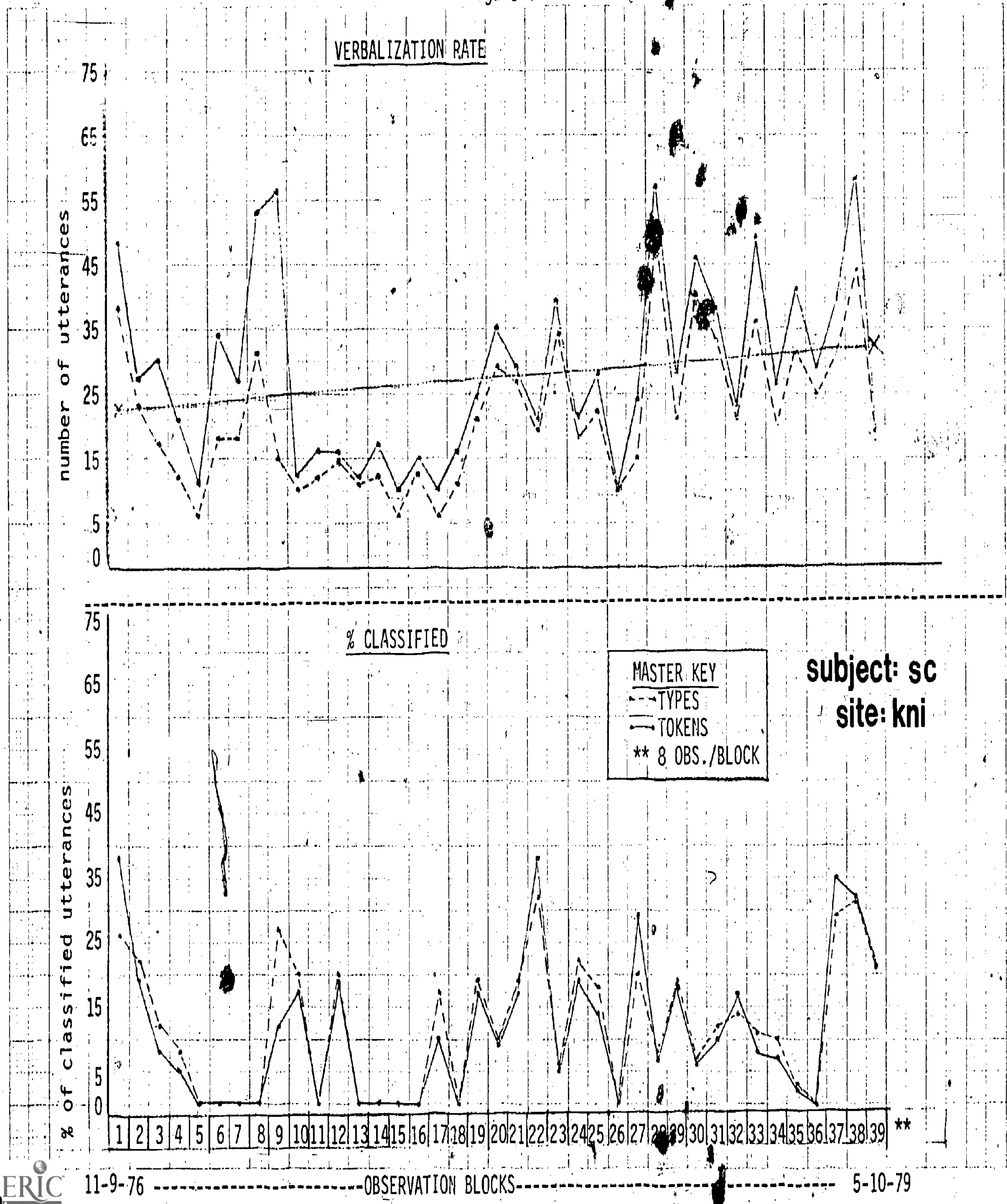


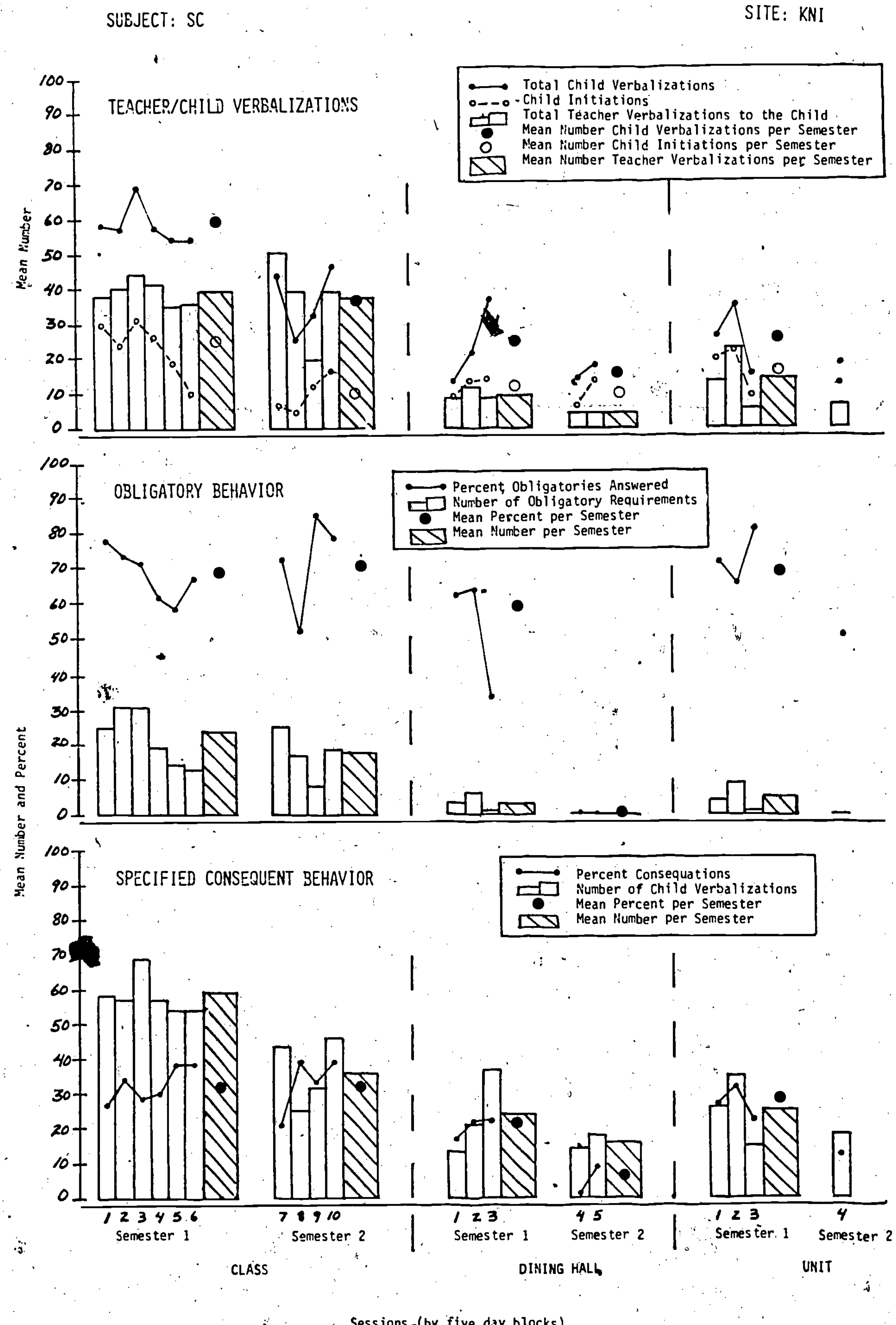
Figure 4



VERBALIZATION RATE
75
65
55
45
35
25
15
5
0
number of utterances
% CLASSIFIED
75
65
55
45
35
25
15
5
0
% of classified utterances
MASTER KEY
TYPES
TOKENS
** 8 OBS./BLOCK
subject: sc
site: kni
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 **
11-9-76
OBSERVATION BLOCKS
5-10-79

## VERBAL INTERACTION ANALYSIS

Figure 5



Subject: D.X.

Site: KNI

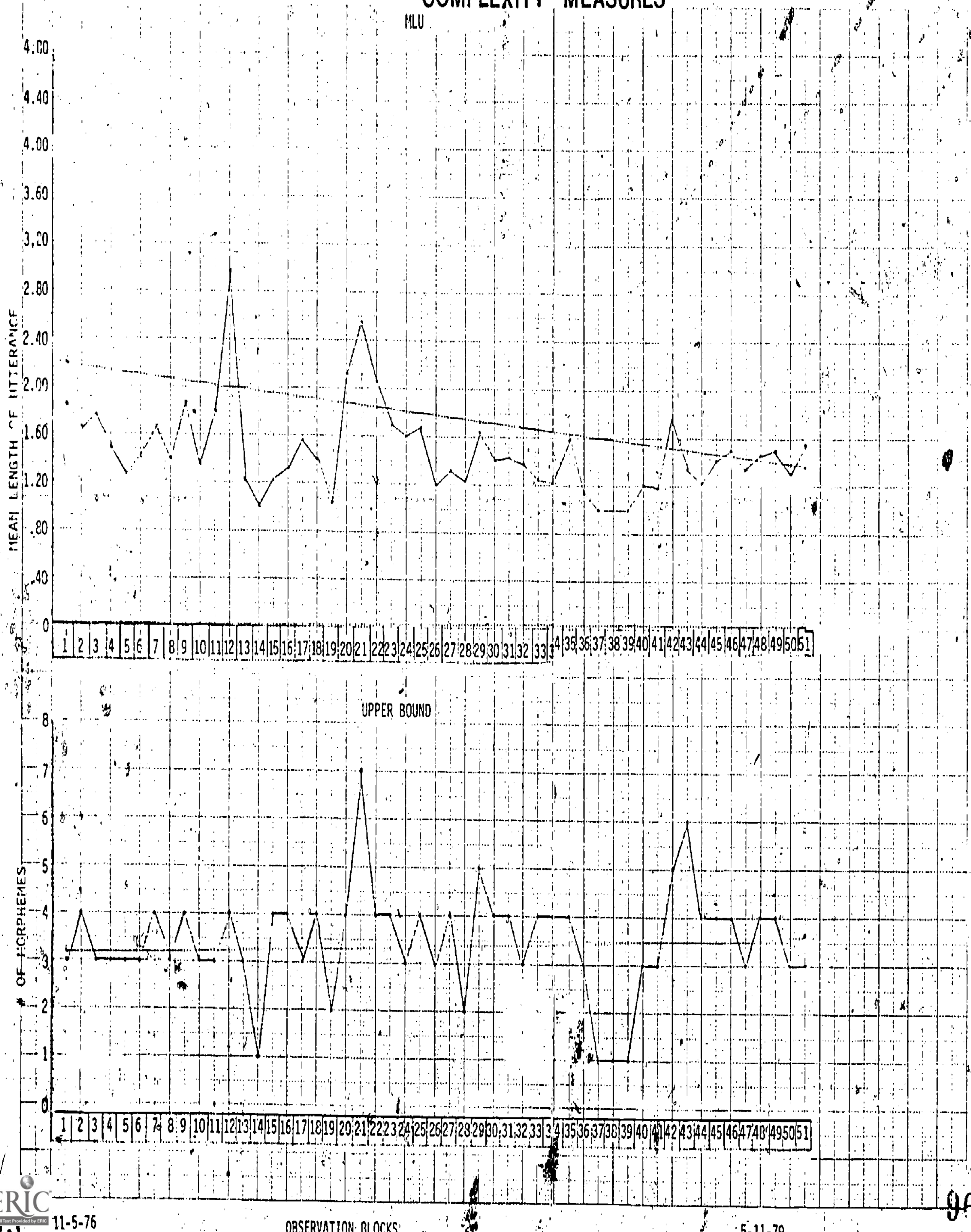
Figures 6 through 10.

SUBJECT: DX

Figure 6

SITE: KNI

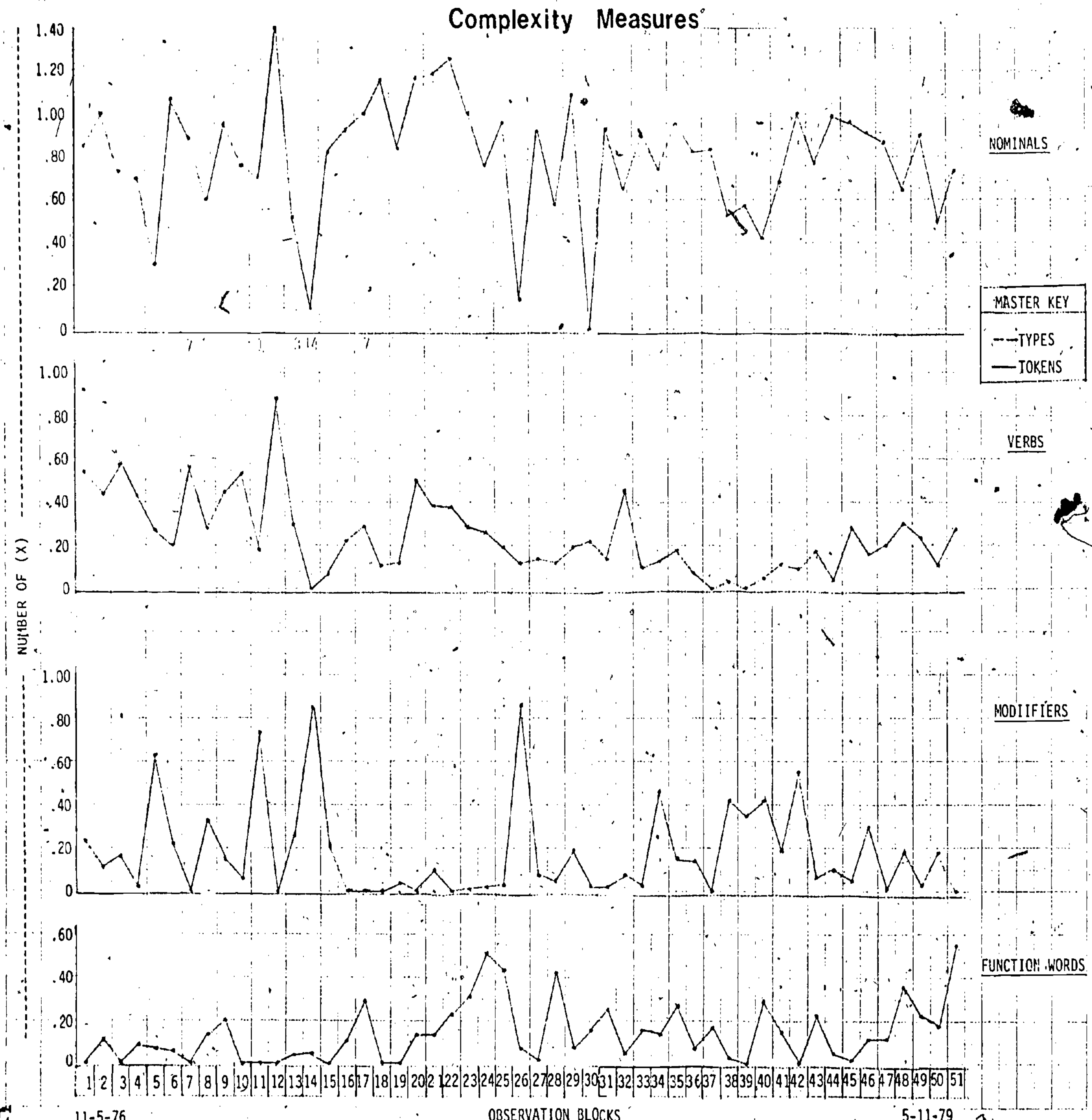
# COMPLEXITY MEASURES



subject: DX

Figure 7

site: KNI



subject:DX

Figure 8

site: KNI

Major Categories

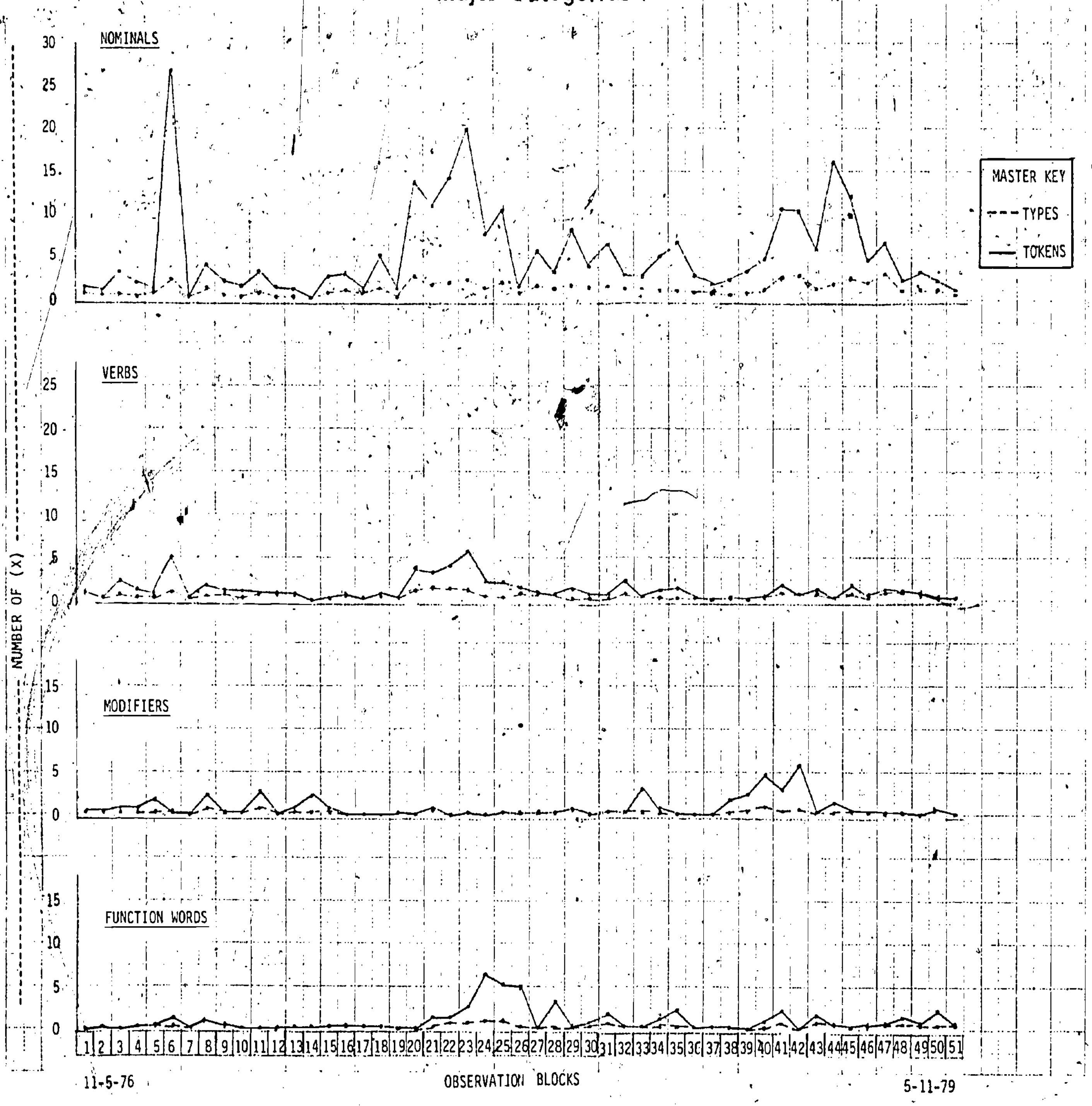
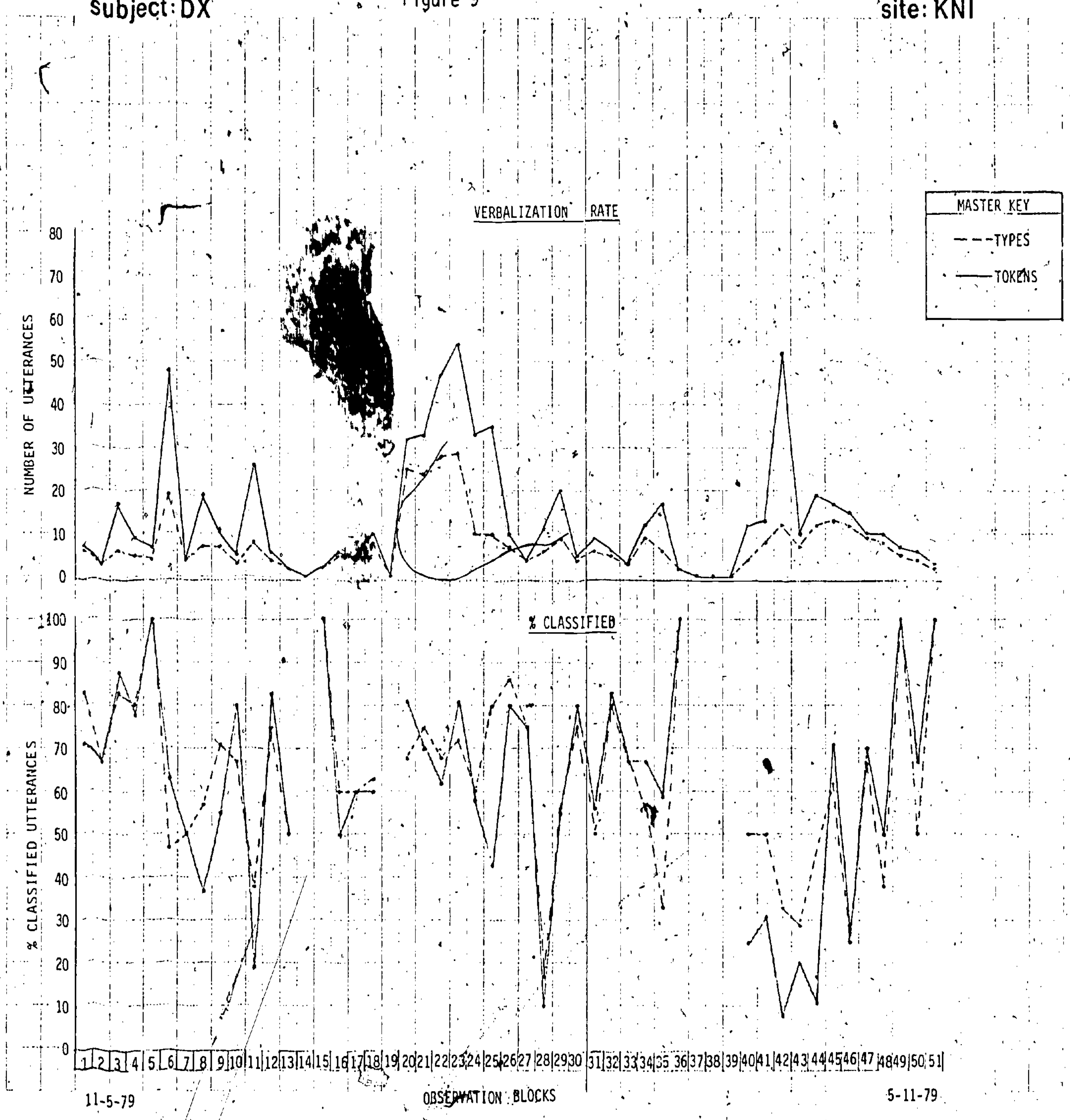


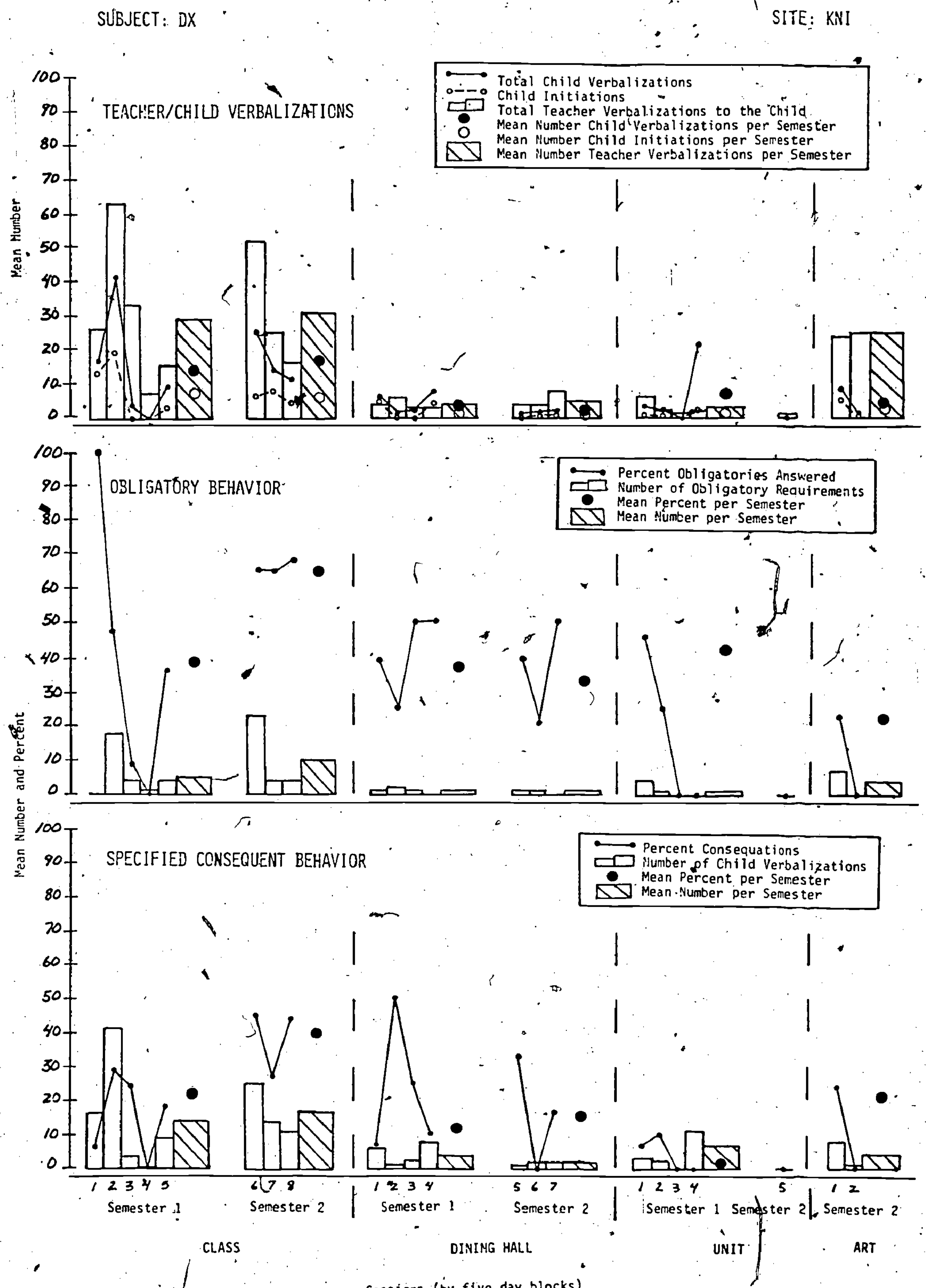
Figure 9



subject: DX
site: KNI
VERBALIZATION RATE
MASTER KEY
TYPES
TOKENS
NUMBER OF UTTERANCES
80
70
60
50
40
30
20
10
0
% CLASSIFIED
% CLASSIFIED UTTERANCES
100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51
11-5-79
OBSERVATION BLOCKS
5-11-79


101

Figure 10
VERBAL INTERACTION ANALYSIS



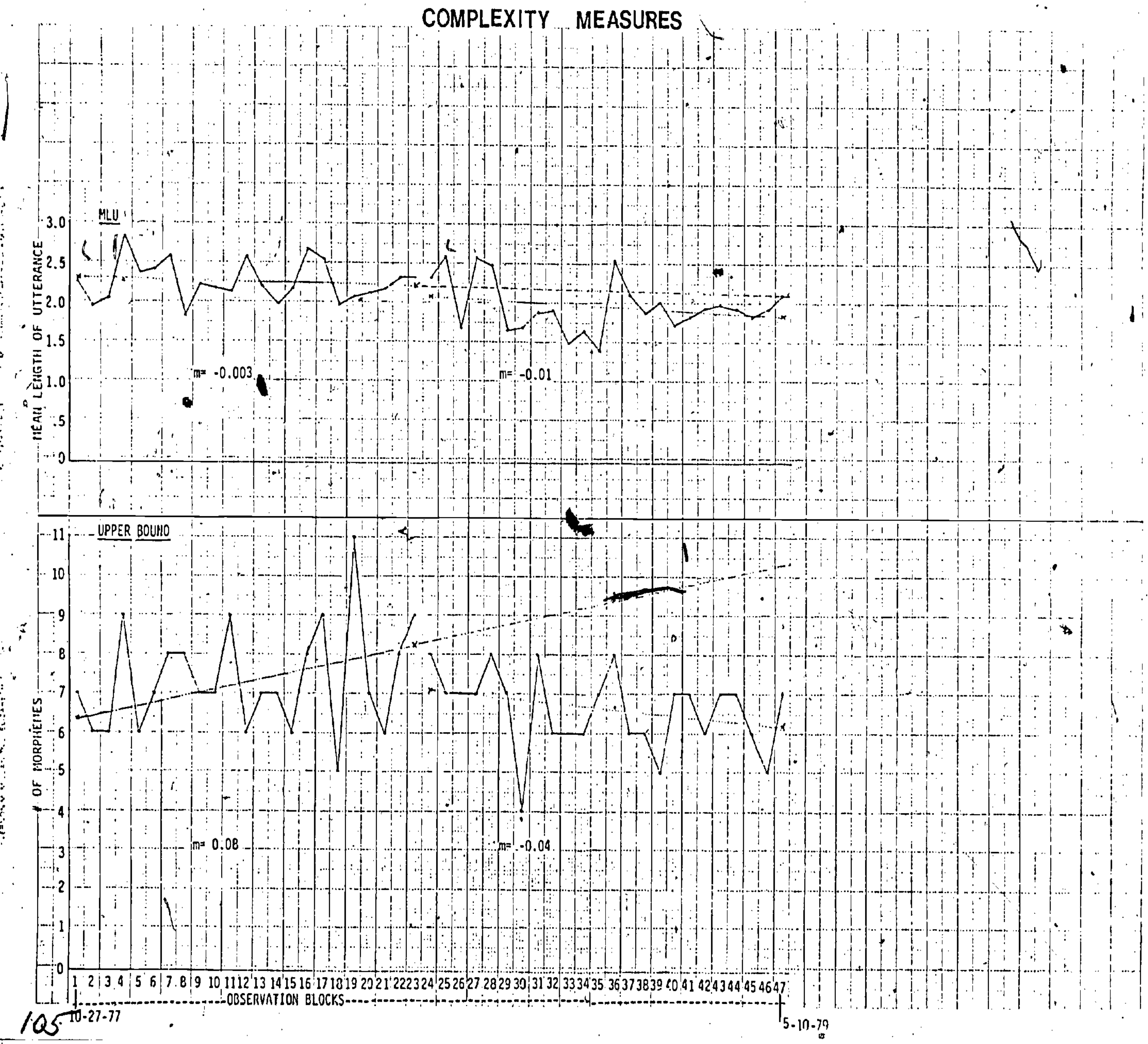
Subject: C.L.

Site: KNI

Figures 11 through 15

Figure 11

SUBJECT: CL SITE: KNI




105

Figure 12

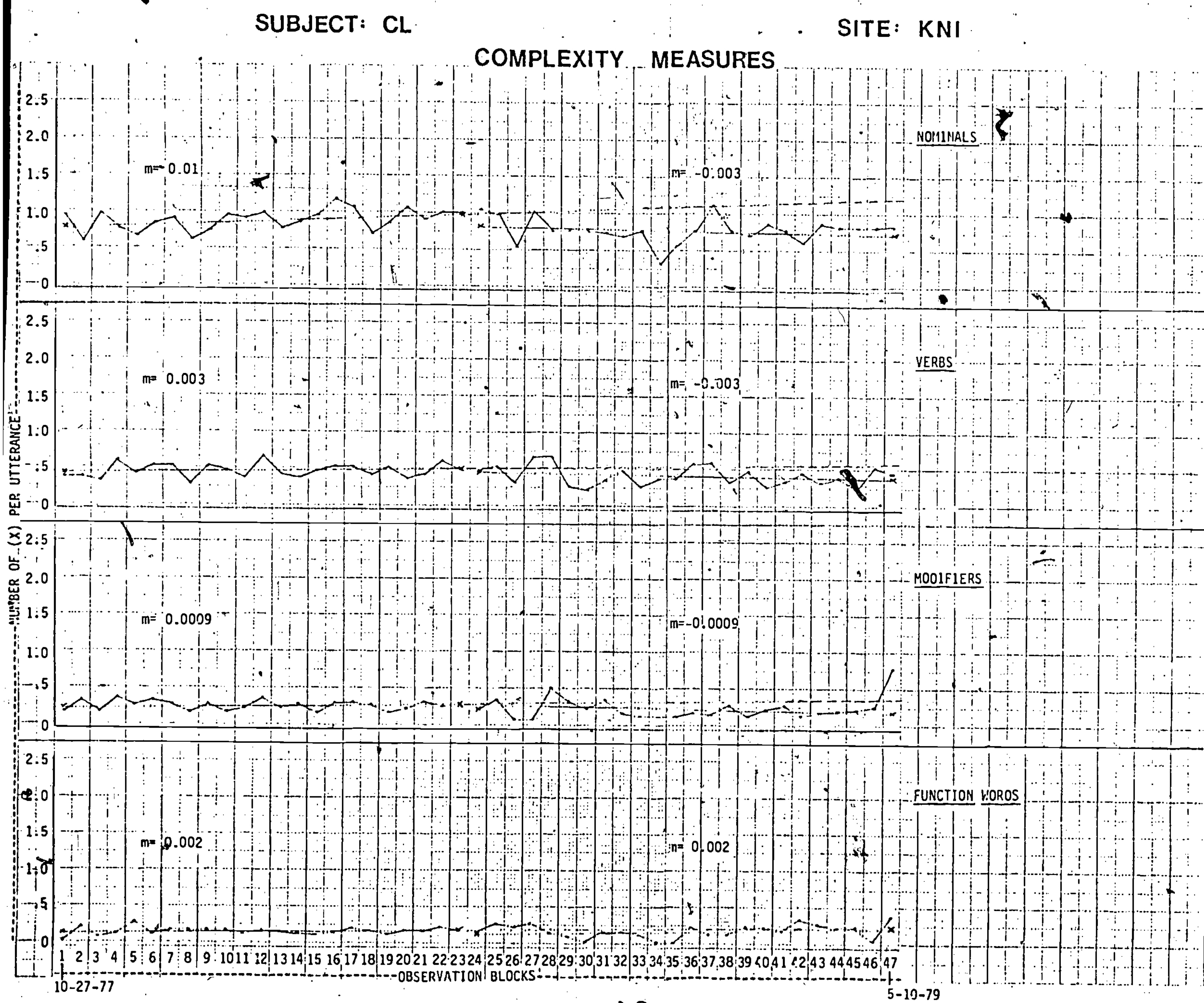

SUBJECT: CL
SITE: KNI
COMPLEXITY MEASURES
NOMINALS
m= 0.01
m= -0.003
VERBS
m= 0.003
m= -0.003
MODIFIERS
m= 0.0009
m=-0.0009
FUNCTION WORDS
m= 0.002
m= 0.002
NUMBER OF (X) PER UTTERANCE
OBSERVATION BLOCKS
10-27-77
5-10-79

Figure 13

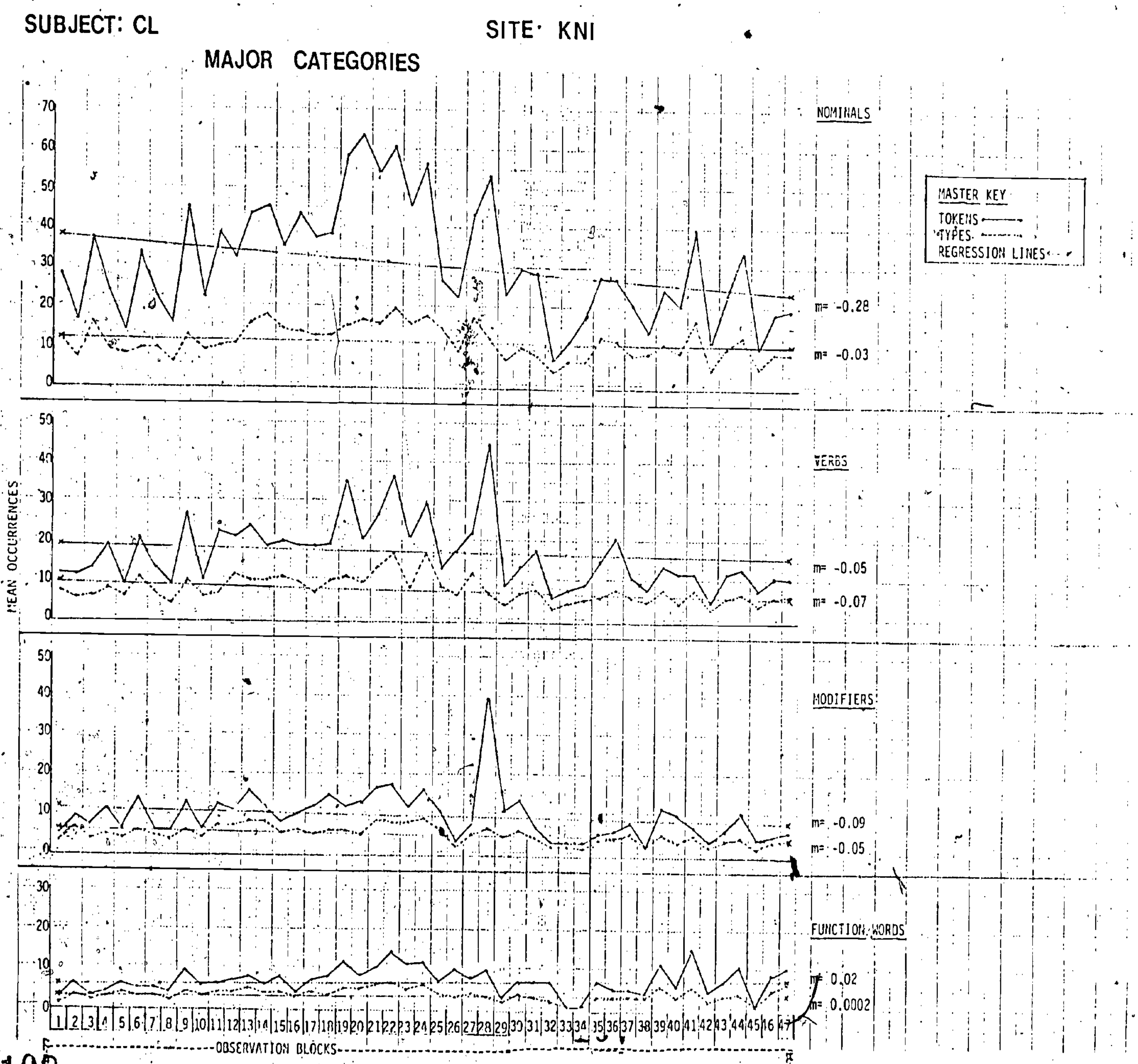
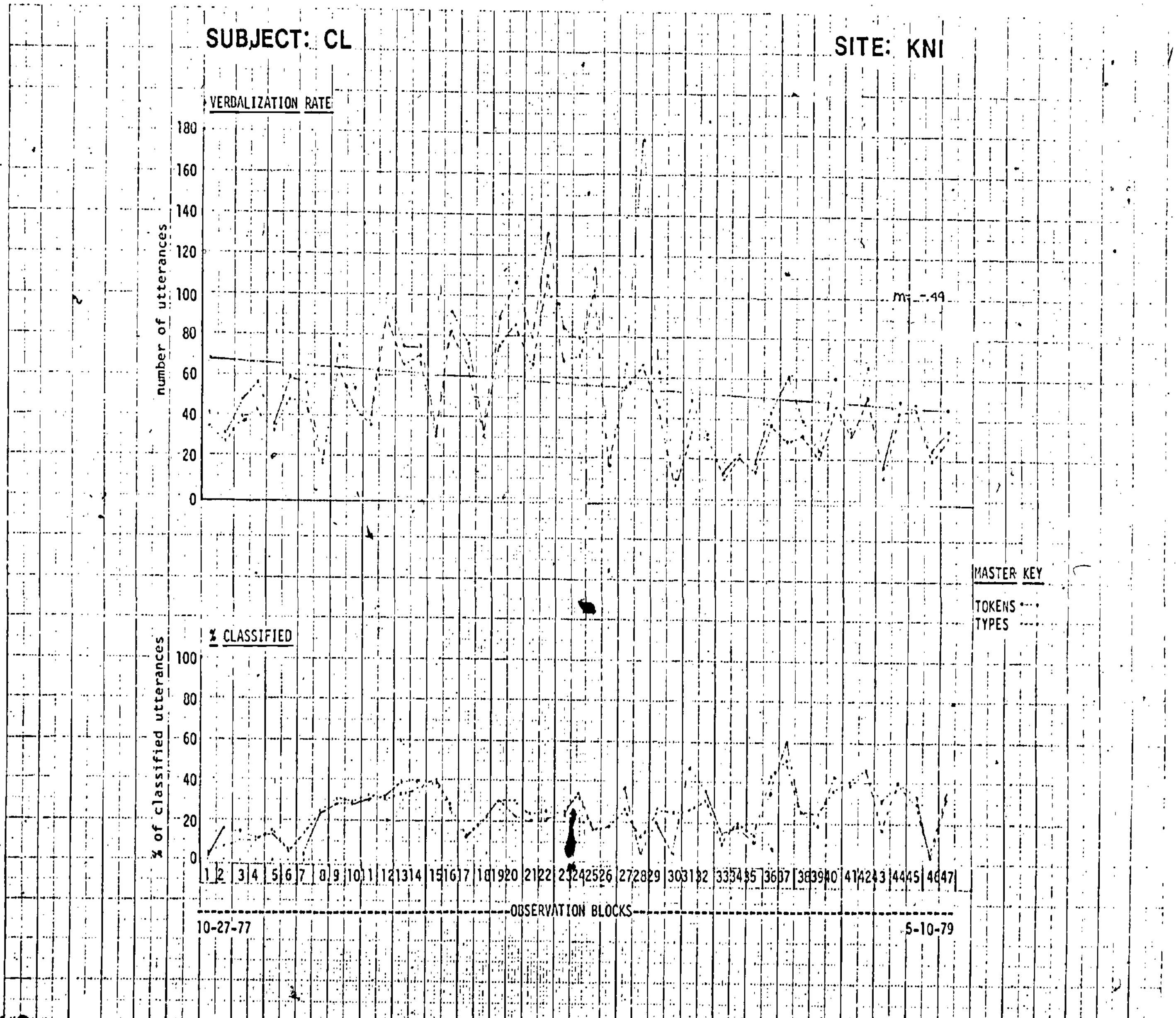

SUBJECT: CL
SITE: KNI
MAJOR CATEGORIES
NOMINALS
MASTER KEY
TOKENS
TYPES
REGRESSION LINES
m= -0.28
m= -0.03
VERBS
m= -0.05
m= -0.07
MODIFIERS
m= -0.09
m= -0.05
FUNCTION WORDS
m= 0.02
m= 0.0002
MEAN OCCURRENCES
OBSERVATION BLOCKS

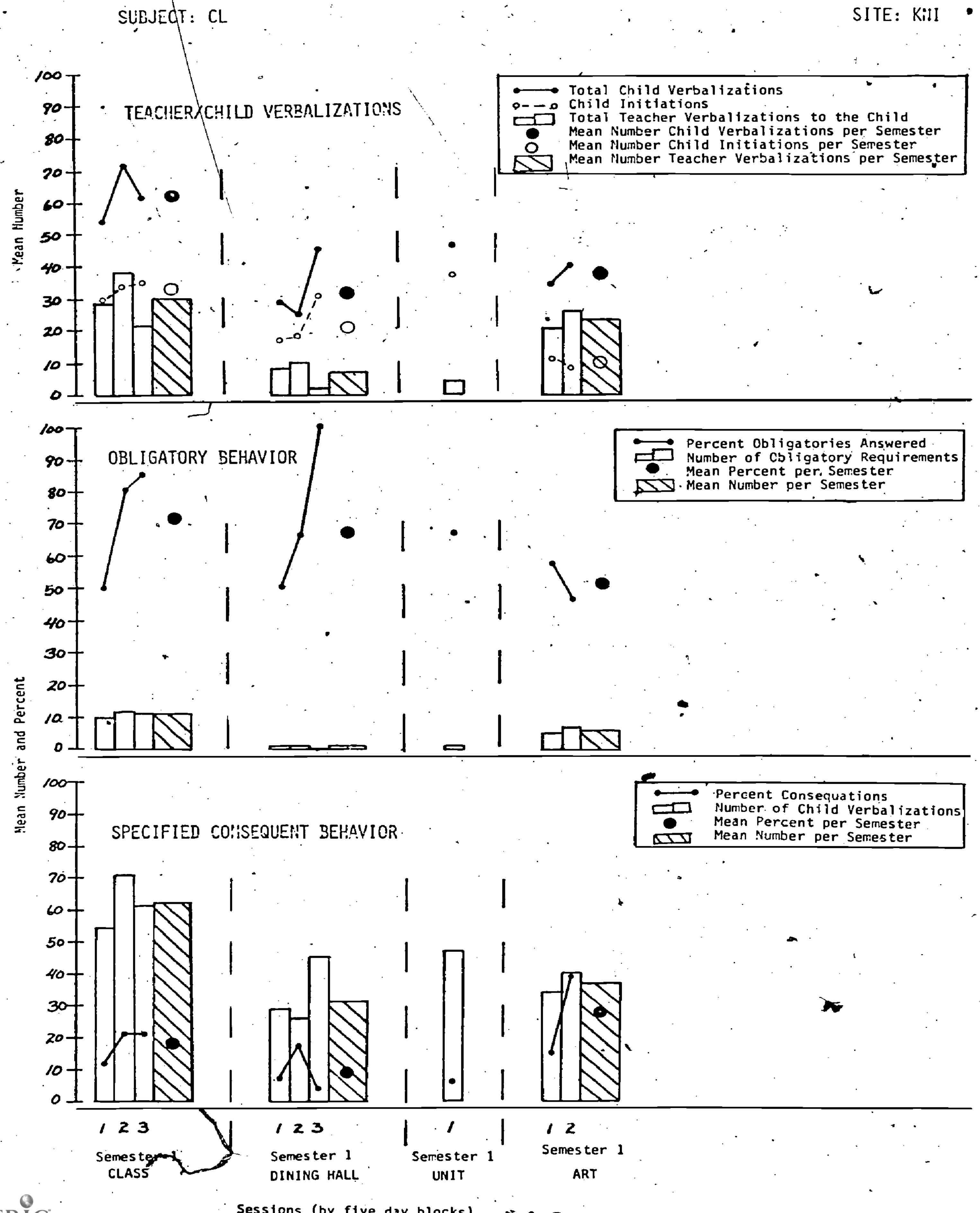
Figure 14



SUBJECT: CL
SITE: KNI
VERBALIZATION RATE
number of utterances
% CLASSIFIED
% of classified utterances
MASTER KEY
TOKENS
TYPES
OBSERVATION BLOCKS
10-27-77
5-10-79

Figure 15

# VERBAL INTERACTION ANALYSIS



Subject: B.T.

Site: KNI

Figures 17 through 21

Figure 17

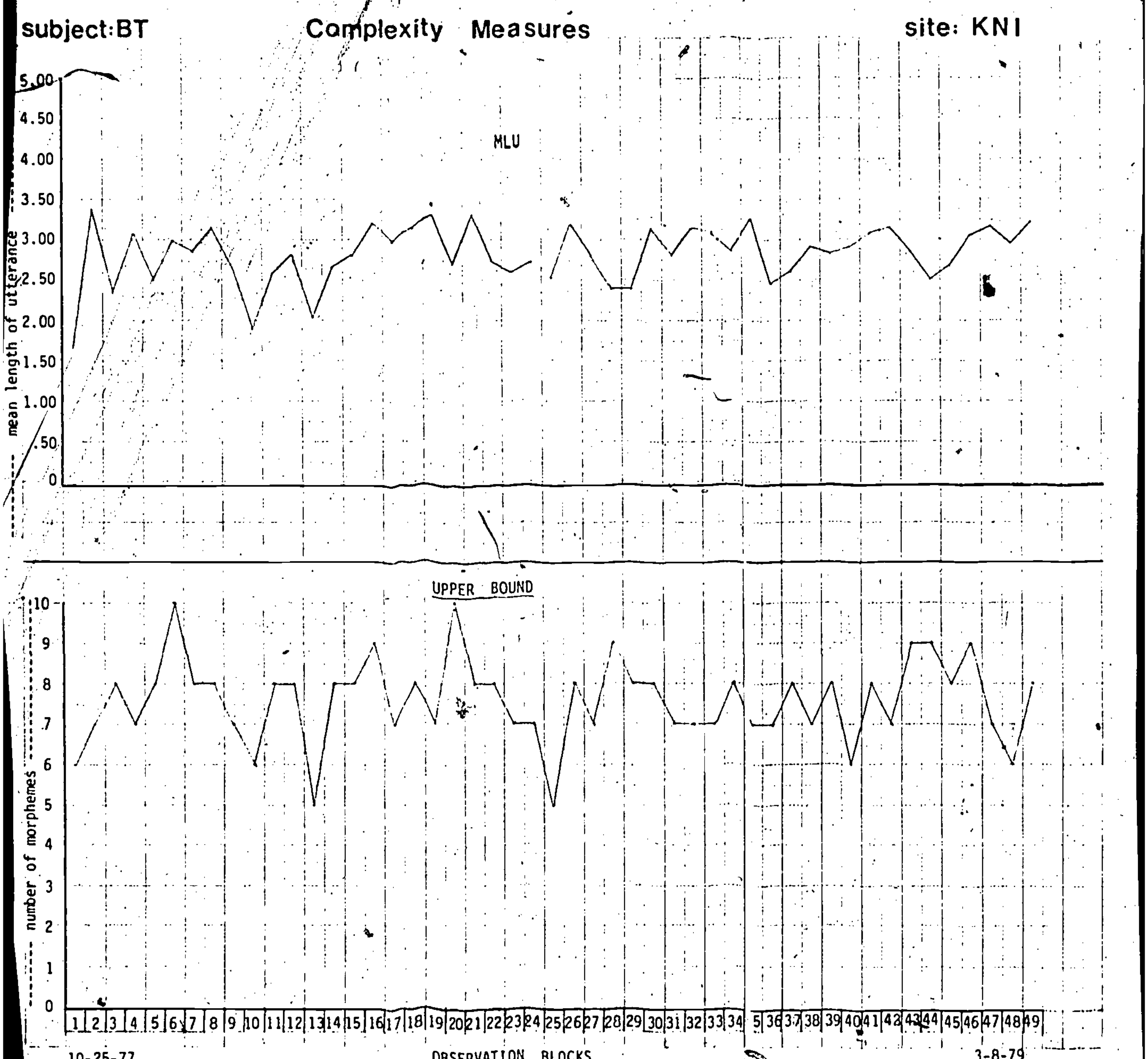
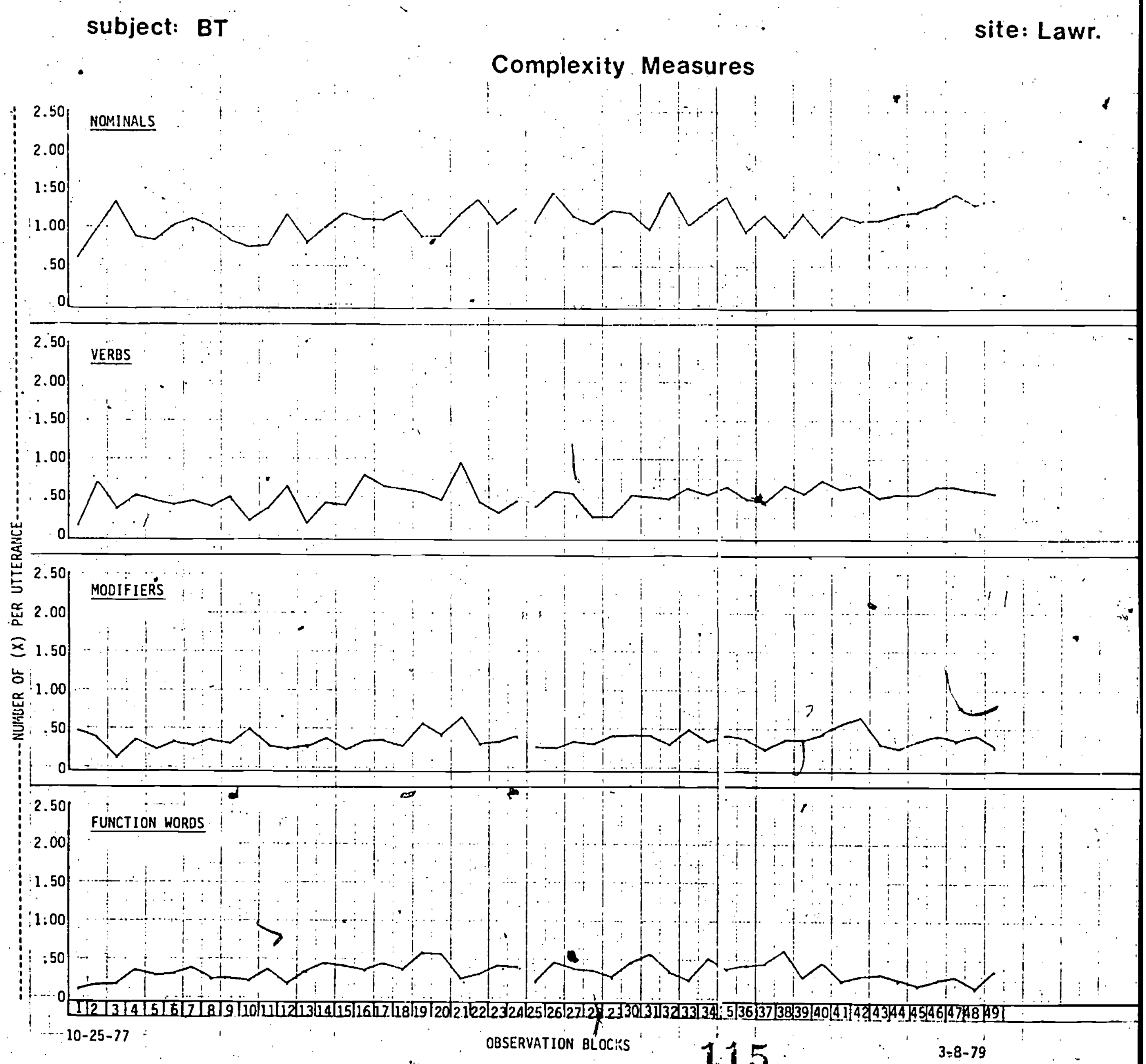

subject: BT
Complexity Measures
site: KNI
MLU
mean length of utterance
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
.50
0
UPPER BOUND
number of morphemes
10
9
8
7
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49
10-25-77
OBSERVATION BLOCKS
3-8-79

Figure 18



subject: BT
site: Lawr.
Complexity Measures
NOMINALS
VERBS
MODIFIERS
FUNCTION WORDS
NUMBER OF (X) PER UTTERANCE
2.50
2.00
1.50
1.00
.50
0
OBSERVATION BLOCKS
10-25-77
3-8-79

Figure 19

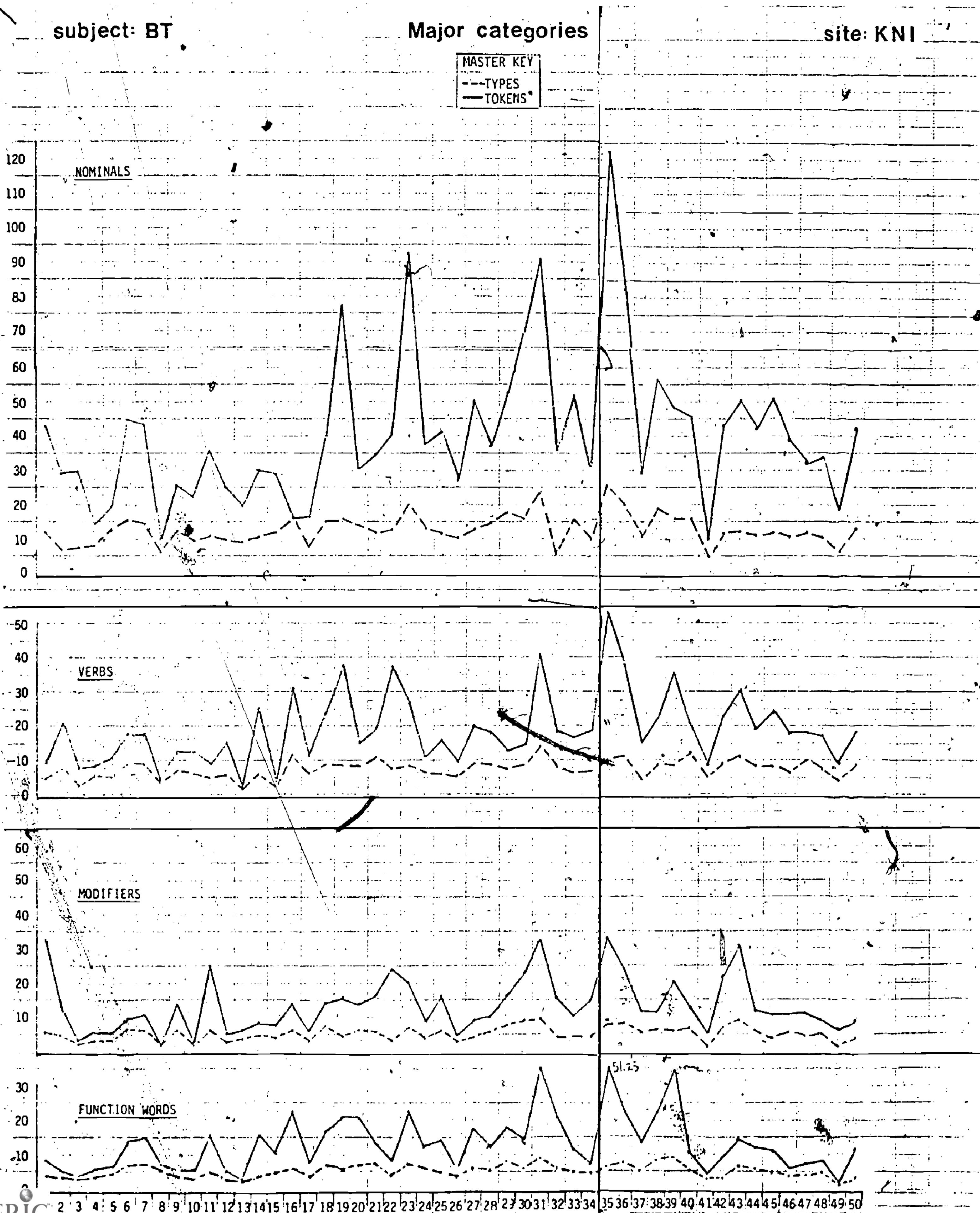
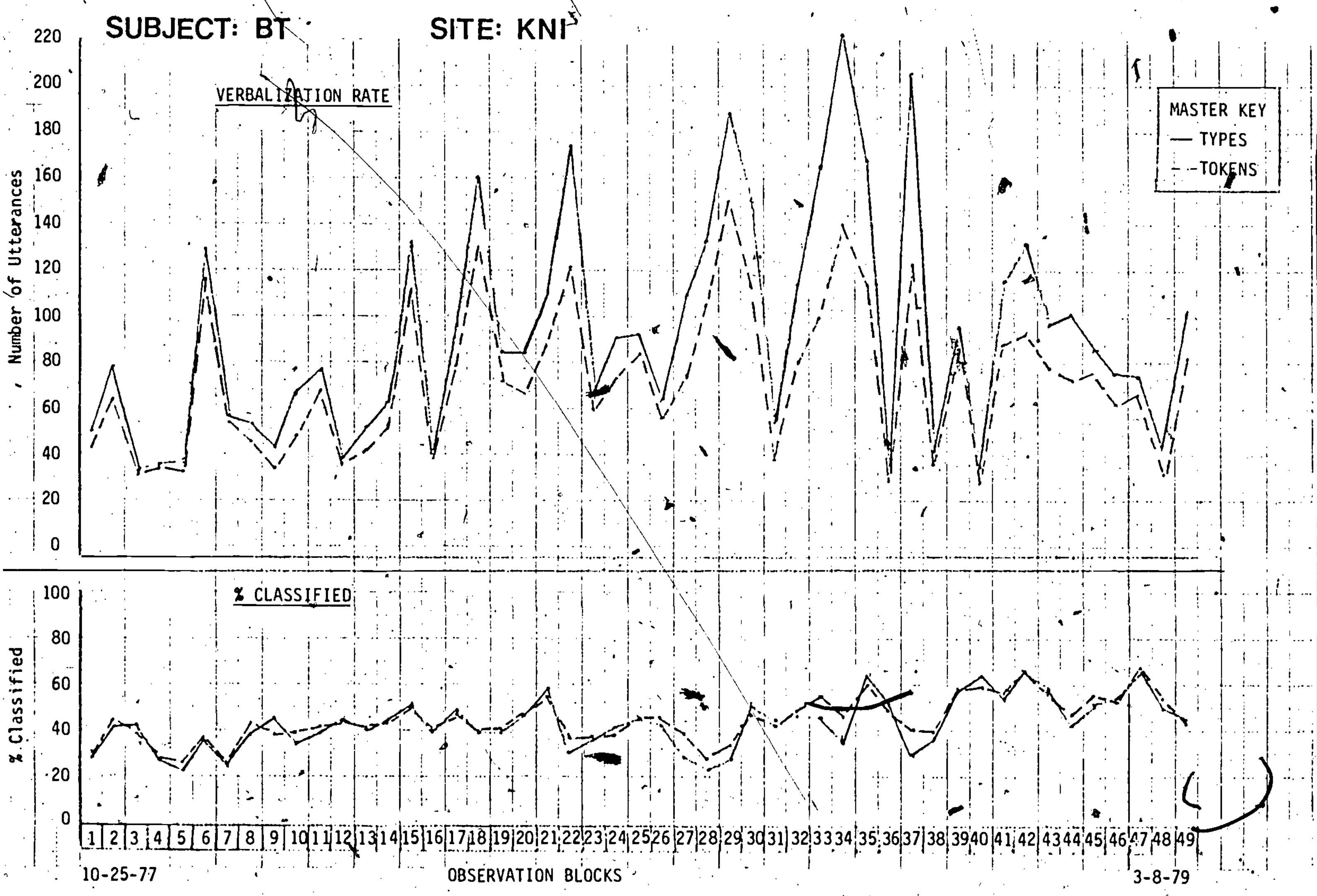

subject: BT
Major categories
site: KNI
MASTER KEY
---TYPES
—TOKENS
NOMINALS
VERBS
MODIFIERS
FUNCTION WORDS

Figure 20



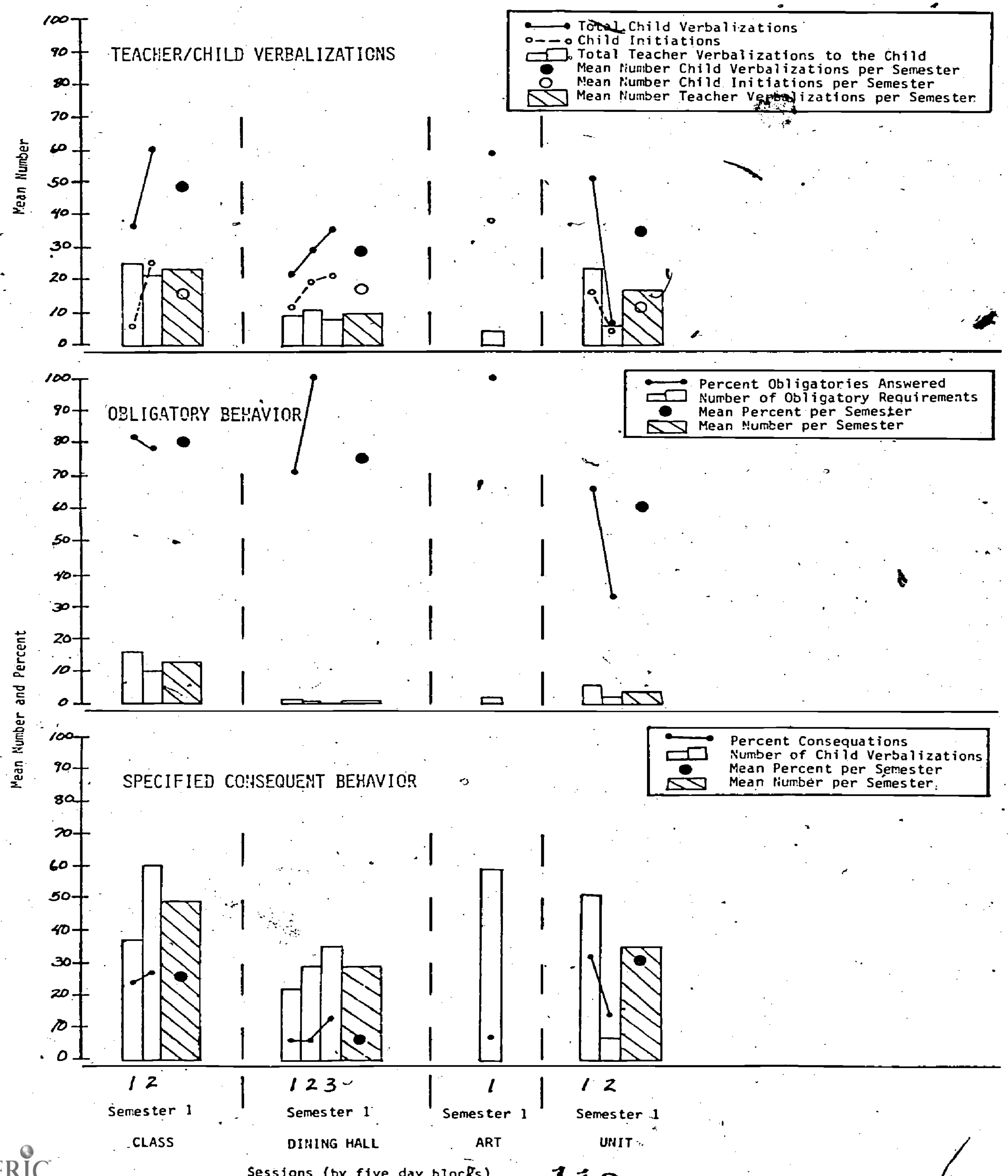
SUBJECT: BT
SITE: KNI
VERBALIZATION RATE
MASTER KEY
— TYPES
- - TOKENS
Number of Utterances
220
200
180
160
140
120
100
80
60
40
20
0
% CLASSIFIED
% Classified
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49
10-25-77
OBSERVATION BLOCKS
3-8-79

Figure 21

# VERBAL INTERACTION ANALYSIS

SUBJECT: BT

SITE: KNI



Subject: K.O.

Site: KNI

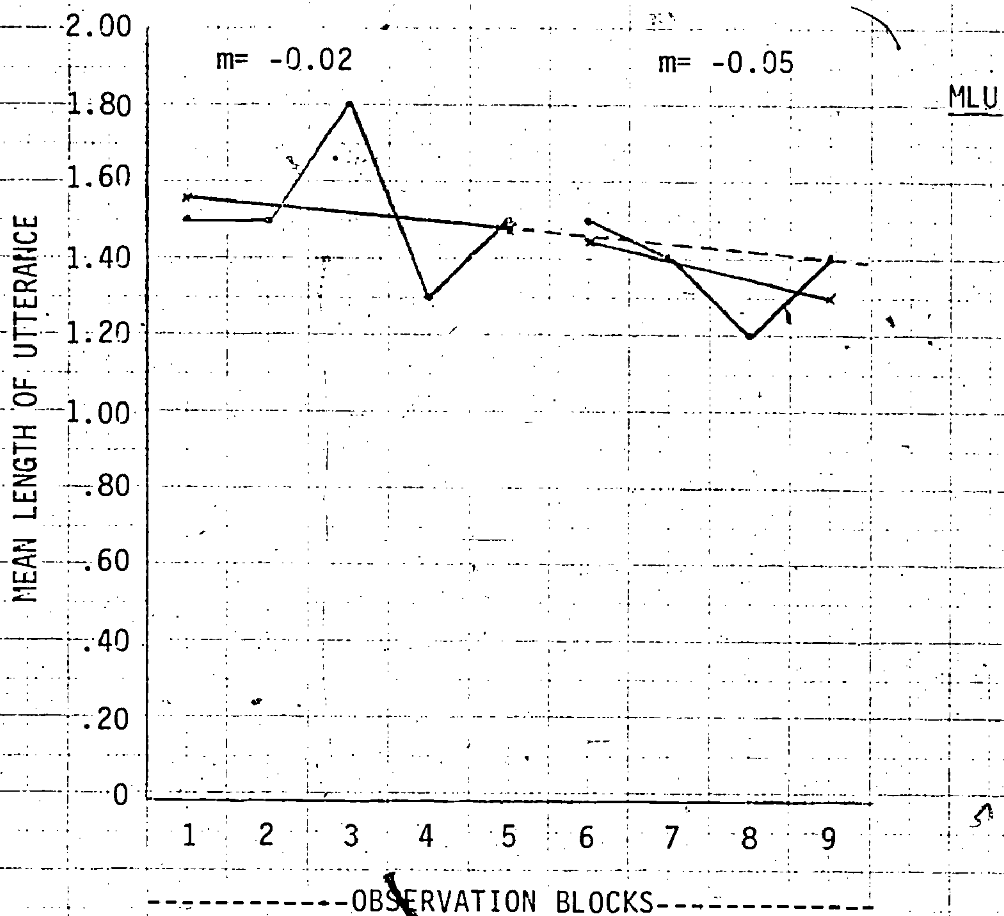
Figures 22 through 25

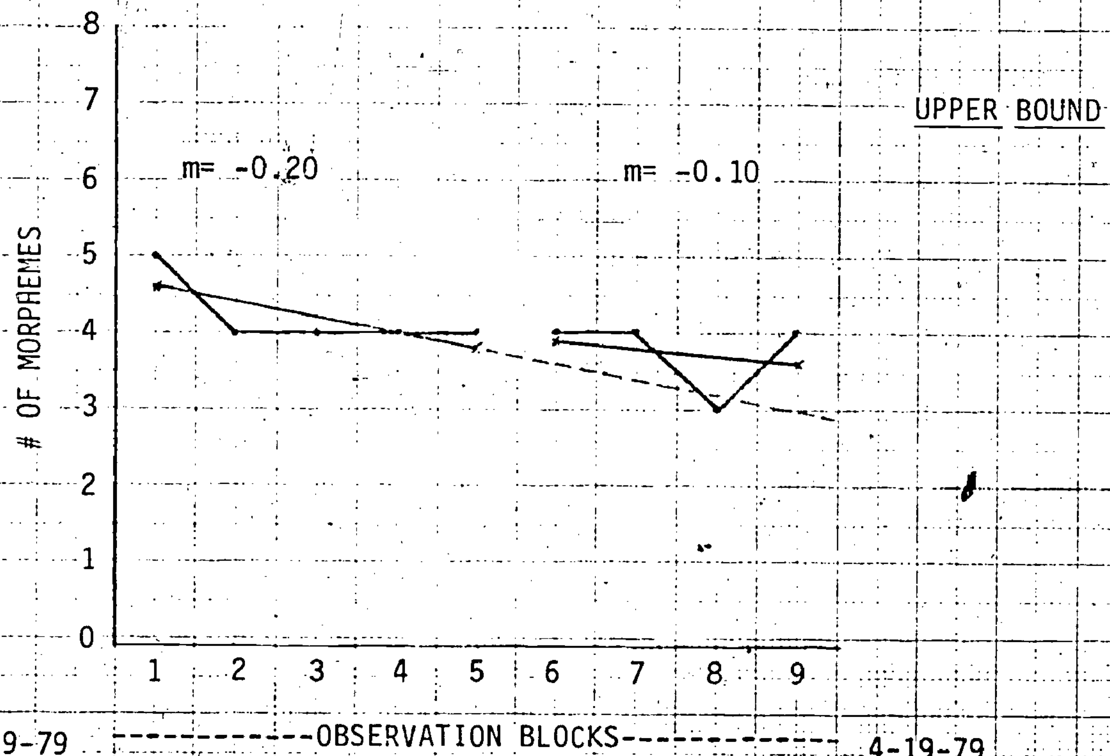
SUBJECT: KO

SITE: KNI

Figure 22

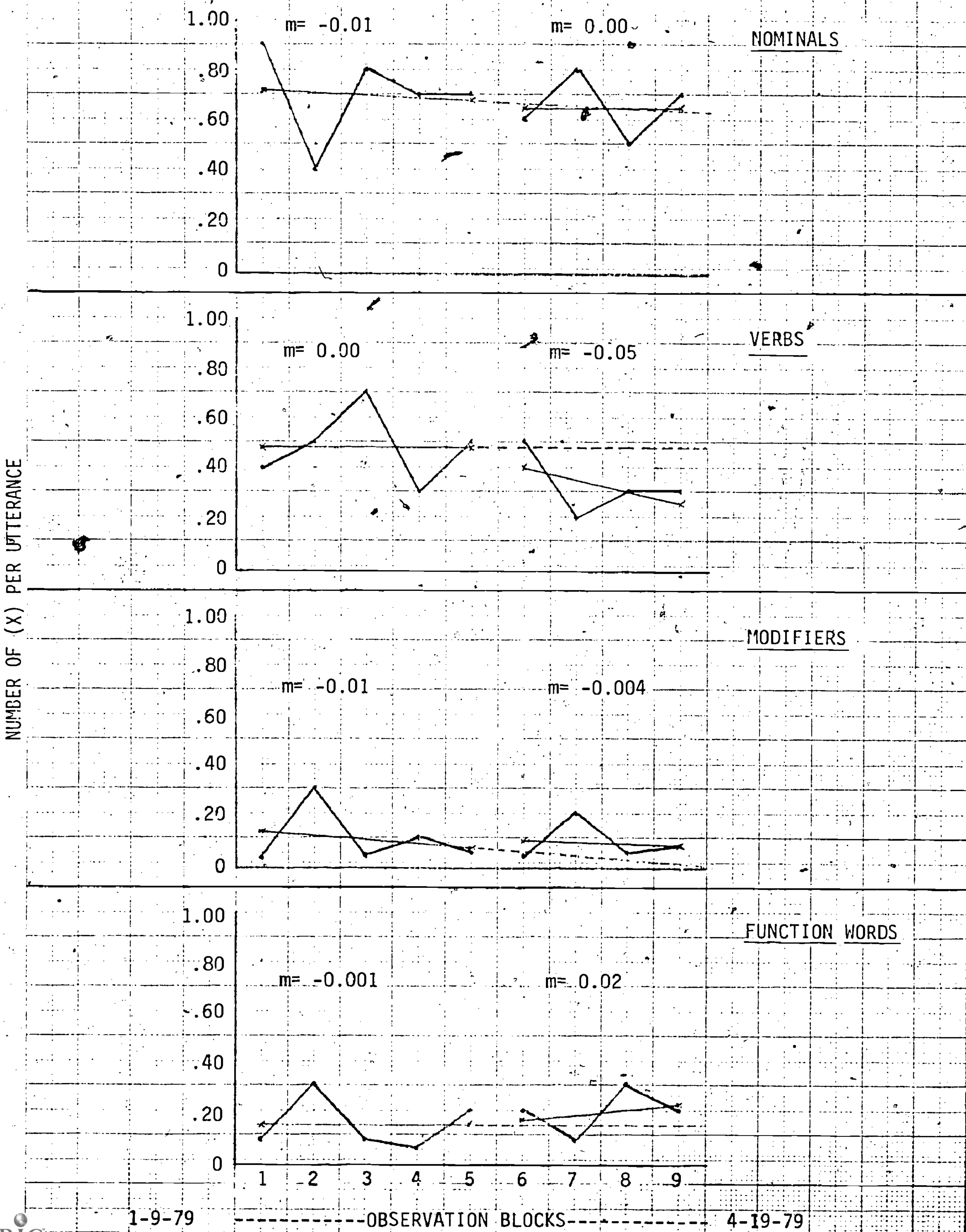
# COMPLEXITY MEASURES



SUBJECT: KO | Figure 23 | SITE: KNI

# COMPLEXITY MEASURES



SUBJECT: KO

Figure 24

SITE: KNI

# MAJOR CATEGORIES

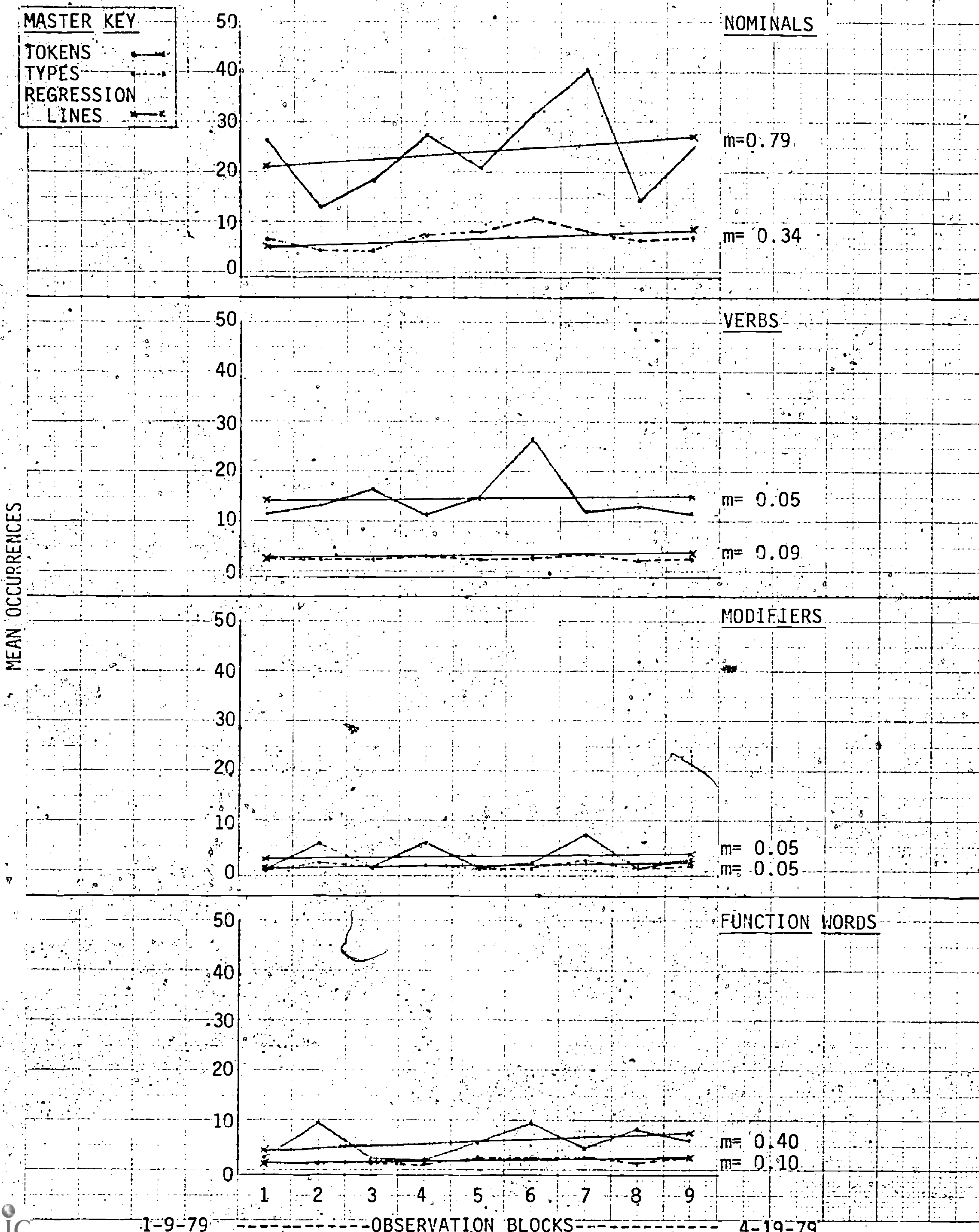
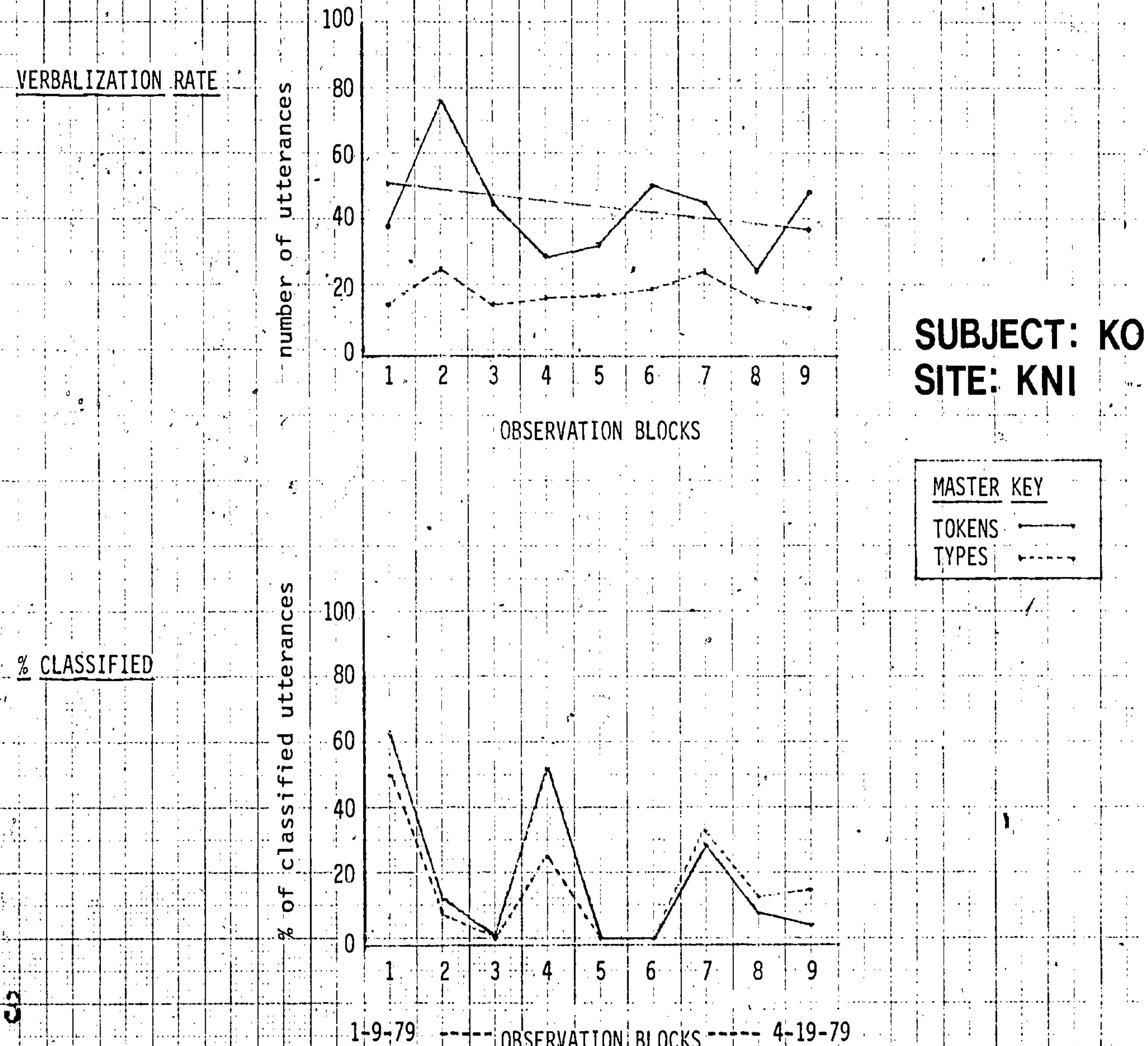


Figure 25


VERBALIZATION RATE
number of utterances
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
OBSERVATION BLOCKS
SUBJECT: KO
SITE: KNI
MASTER KEY
TOKENS
TYPES
% CLASSIFIED
% of classified utterances
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
1-9-79
OBSERVATION BLOCKS
4-19-79

Subject: B.H.

Site: KNI

Figures 26 through 29

Figure 26

# Complexity measures

subject: BH

site: KNI

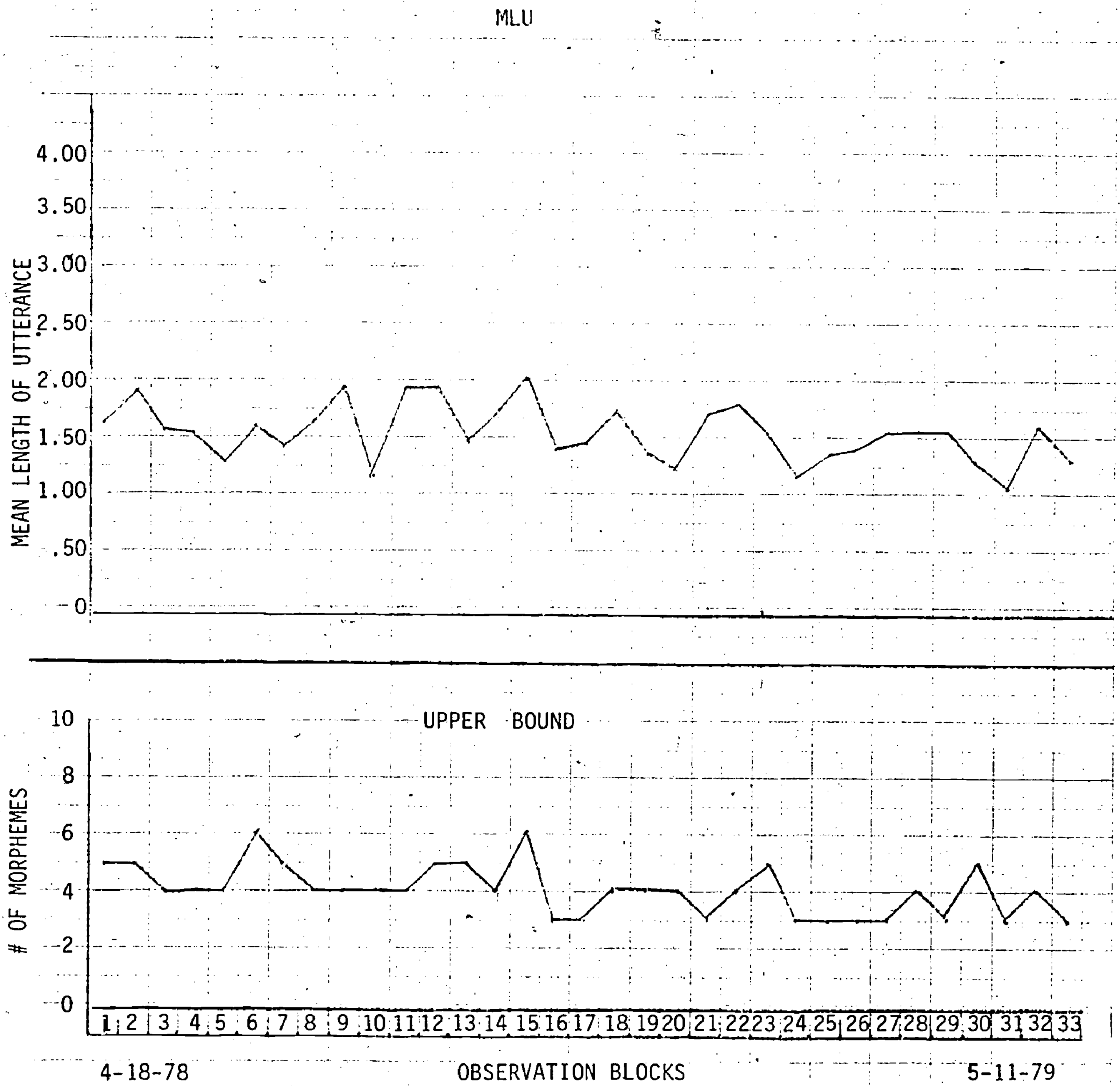


Figure 27

subject: BH **Complexity Measures** site: KNI

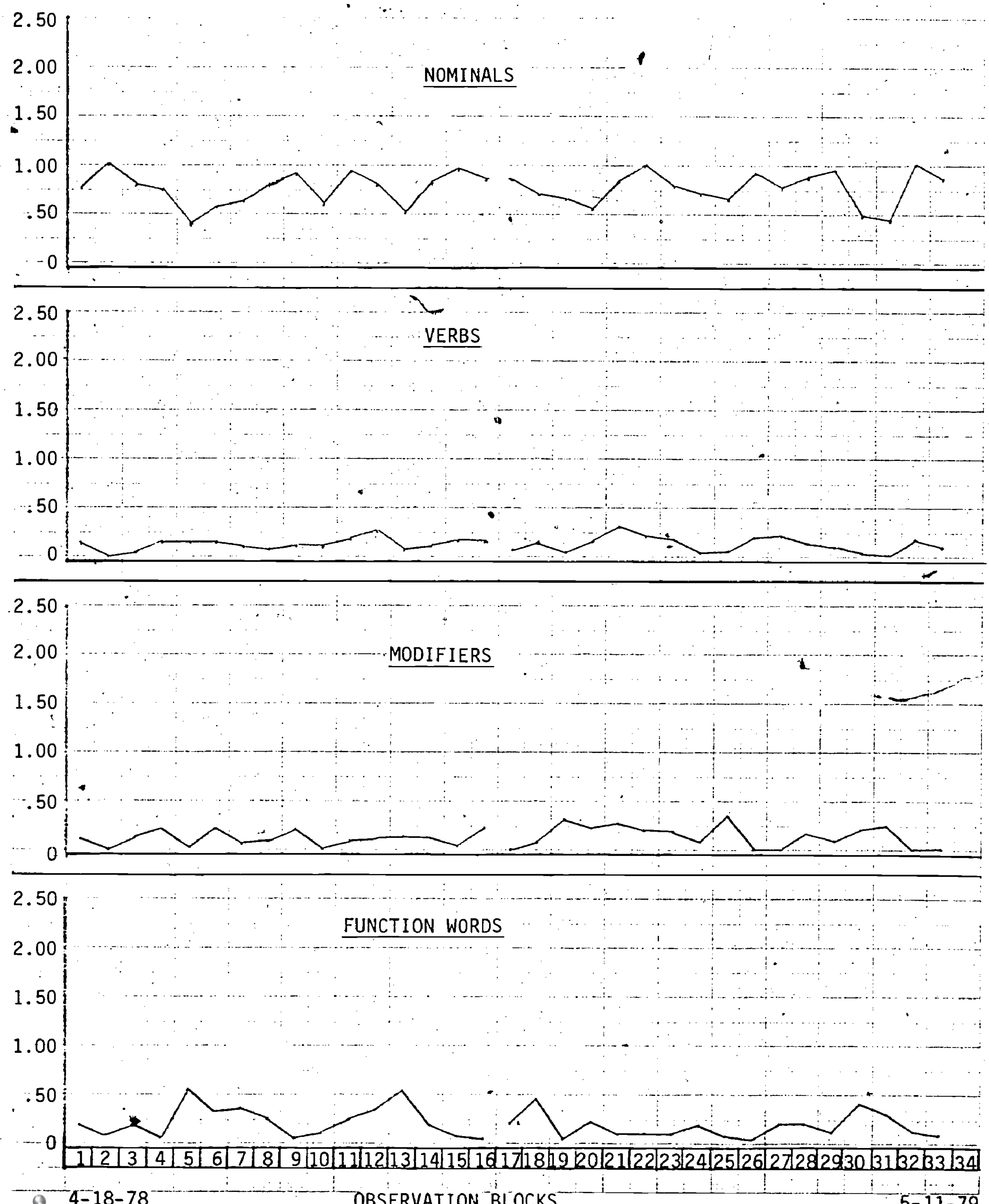


Figure 28
# Major Categories

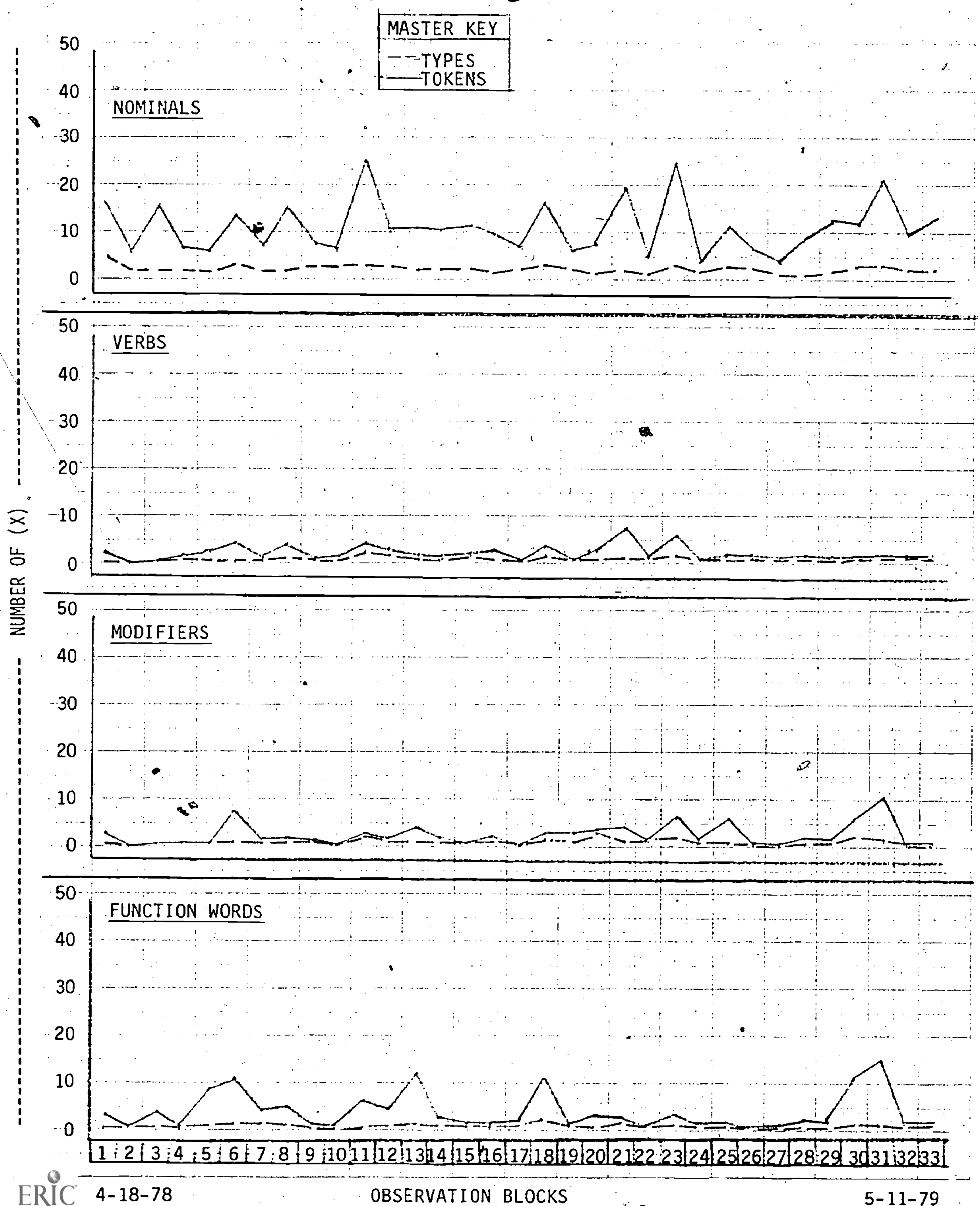
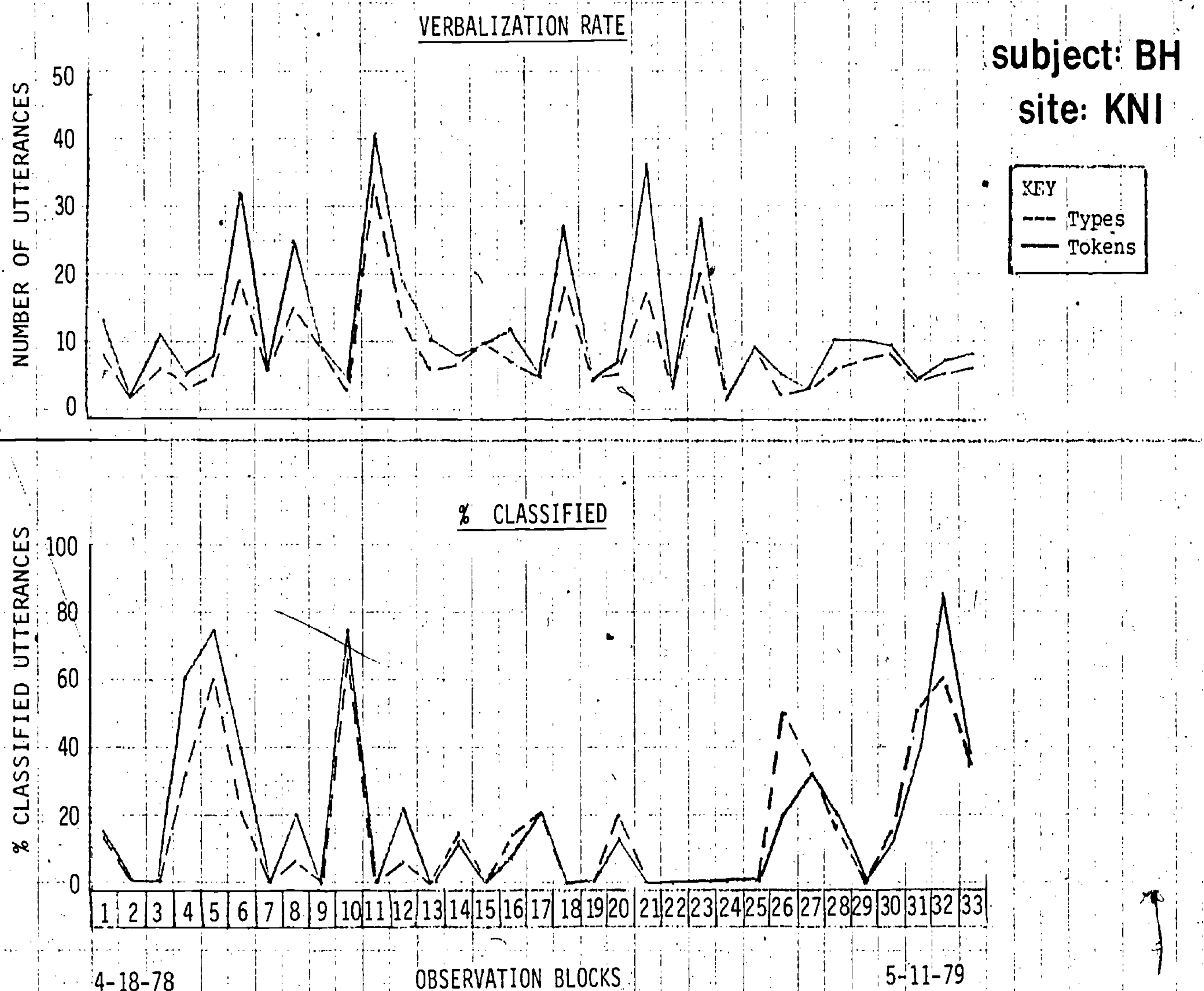


Figure 29


VERBALIZATION RATE
NUMBER OF UTTERANCES
50
40
30
20
10
0
subject: BH
site: KNI
KEY
Types
Tokens
% CLASSIFIED
% CLASSIFIED UTTERANCES
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
4-18-78
OBSERVATION BLOCKS
5-11-79

Subject: W.W.

Site: KNI

Figures 30 through 33

Figure 30

# Complexity measures

**subject: WW** **site: KNI**

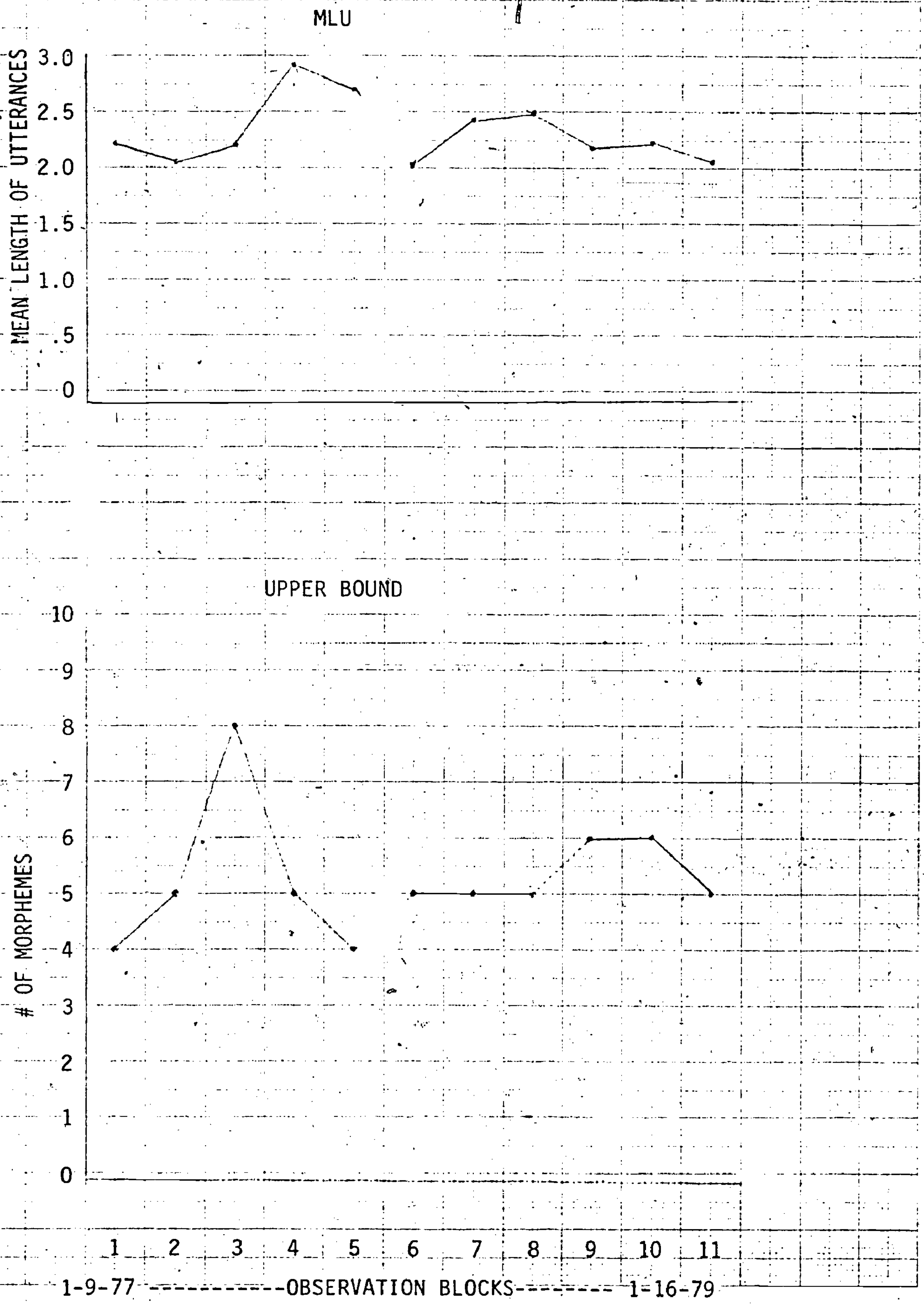


Figure 31

# Complexity measures

subject: WW site: KNI

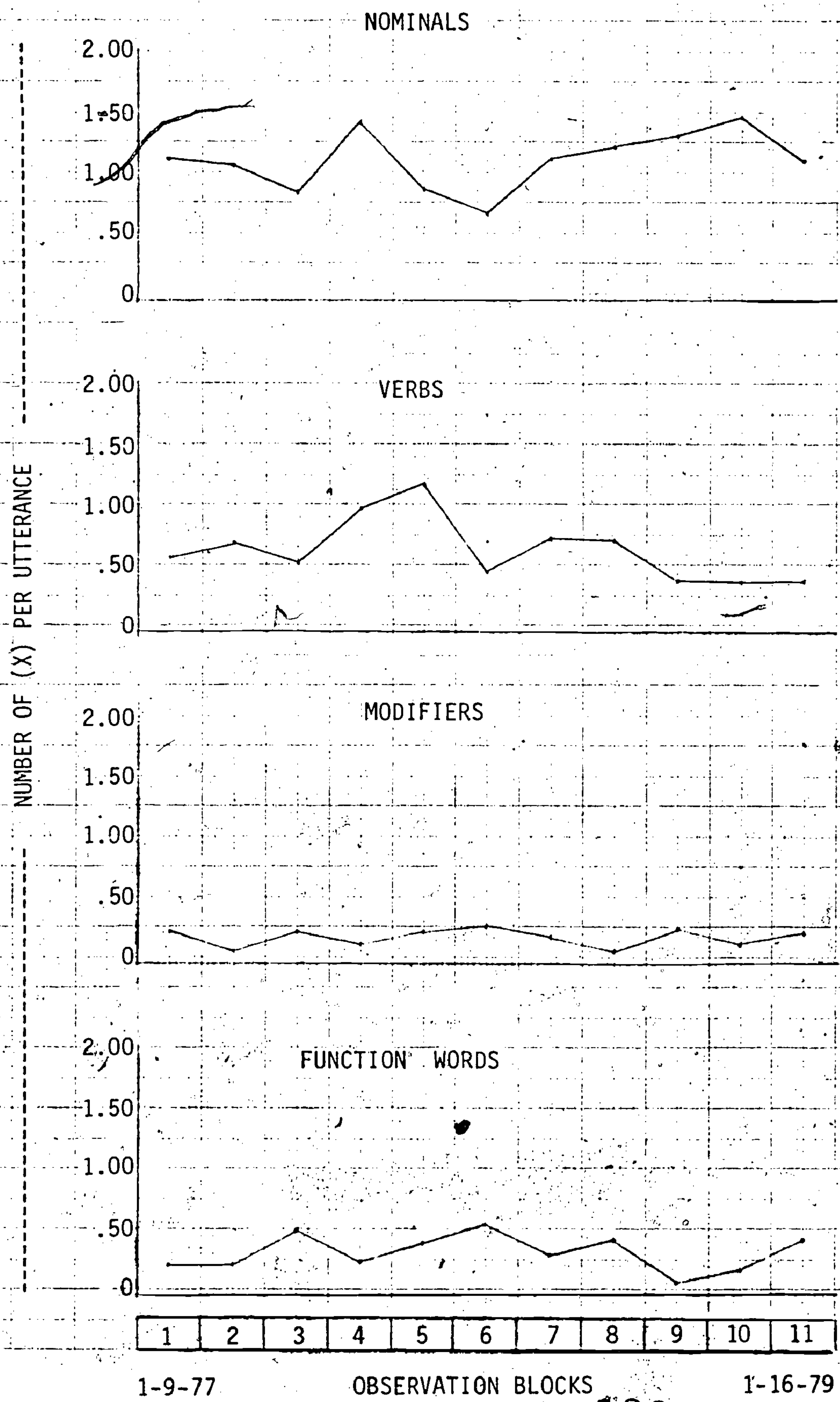
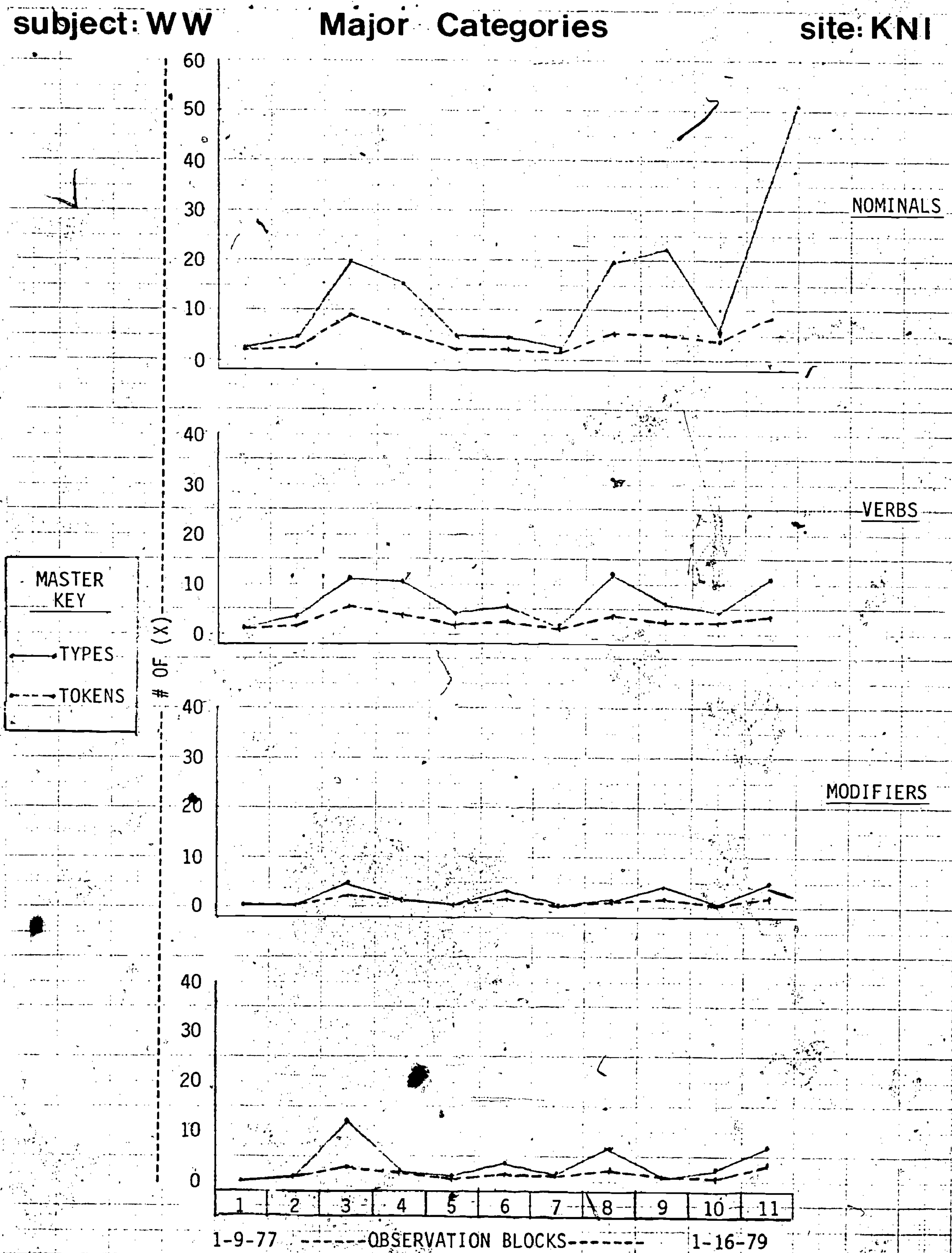


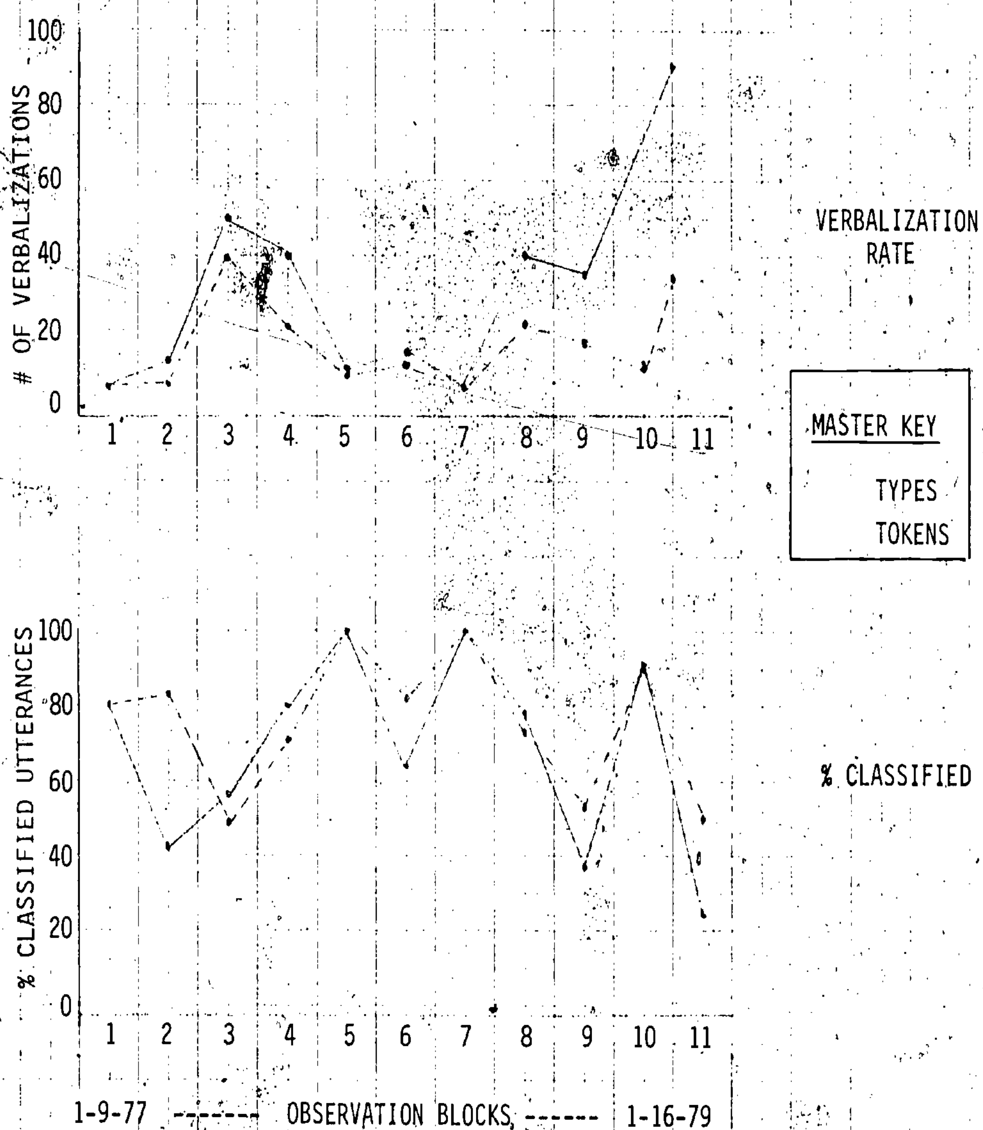
Figure 32



subject: WW
Major Categories
site: KNI
NOMINALS
VERBS
MODIFIERS
MASTER KEY
TYPES
TOKENS
# OF (X)
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
1-9-77 ------OBSERVATION BLOCKS------- 1-16-79

Figure 33

subject: WW
site: KNI



Subject: K.M.

Site: KNI

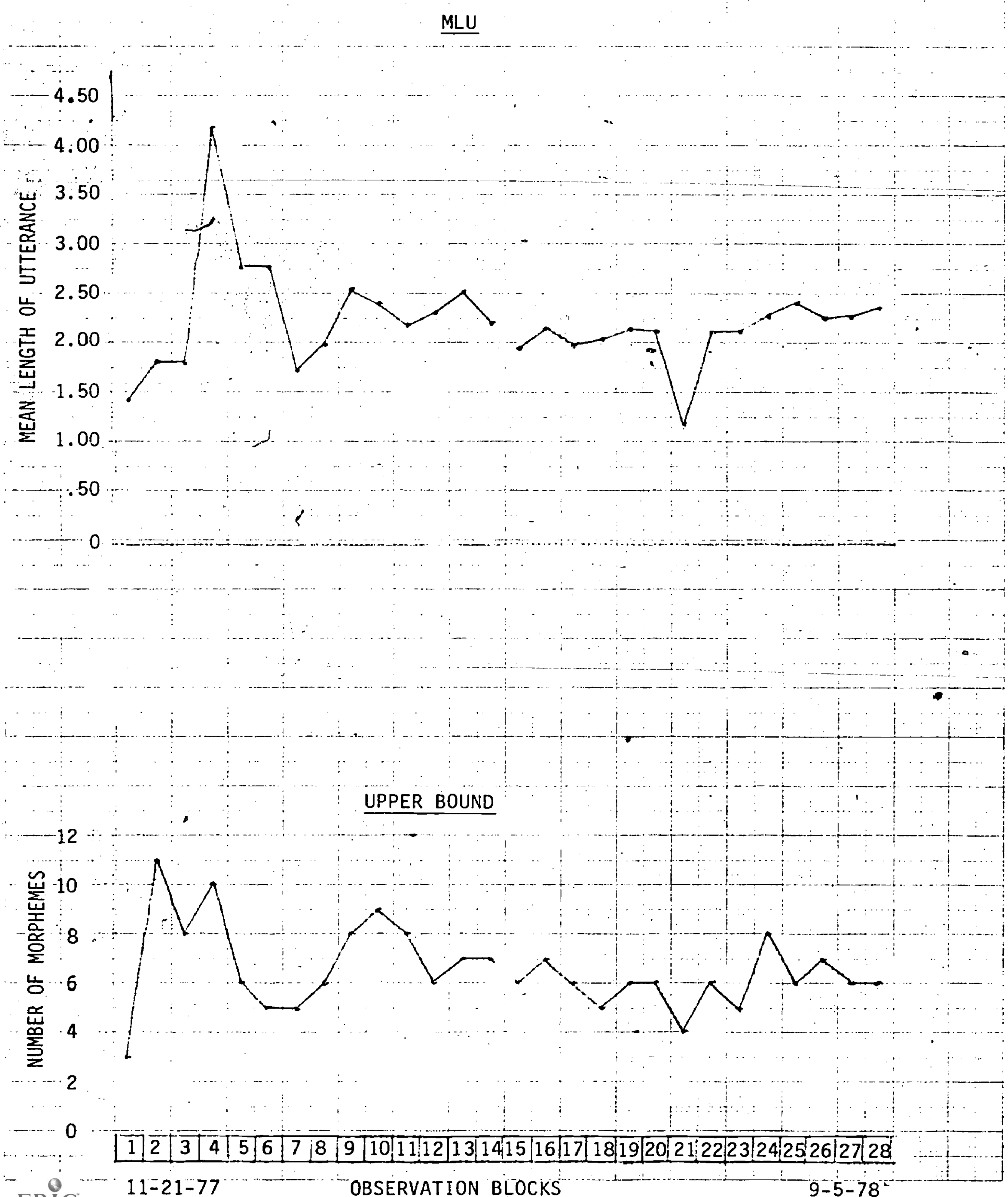
Figures 34 through 38

subject: KM

Figure 34

site: KNT

# Complexity measures

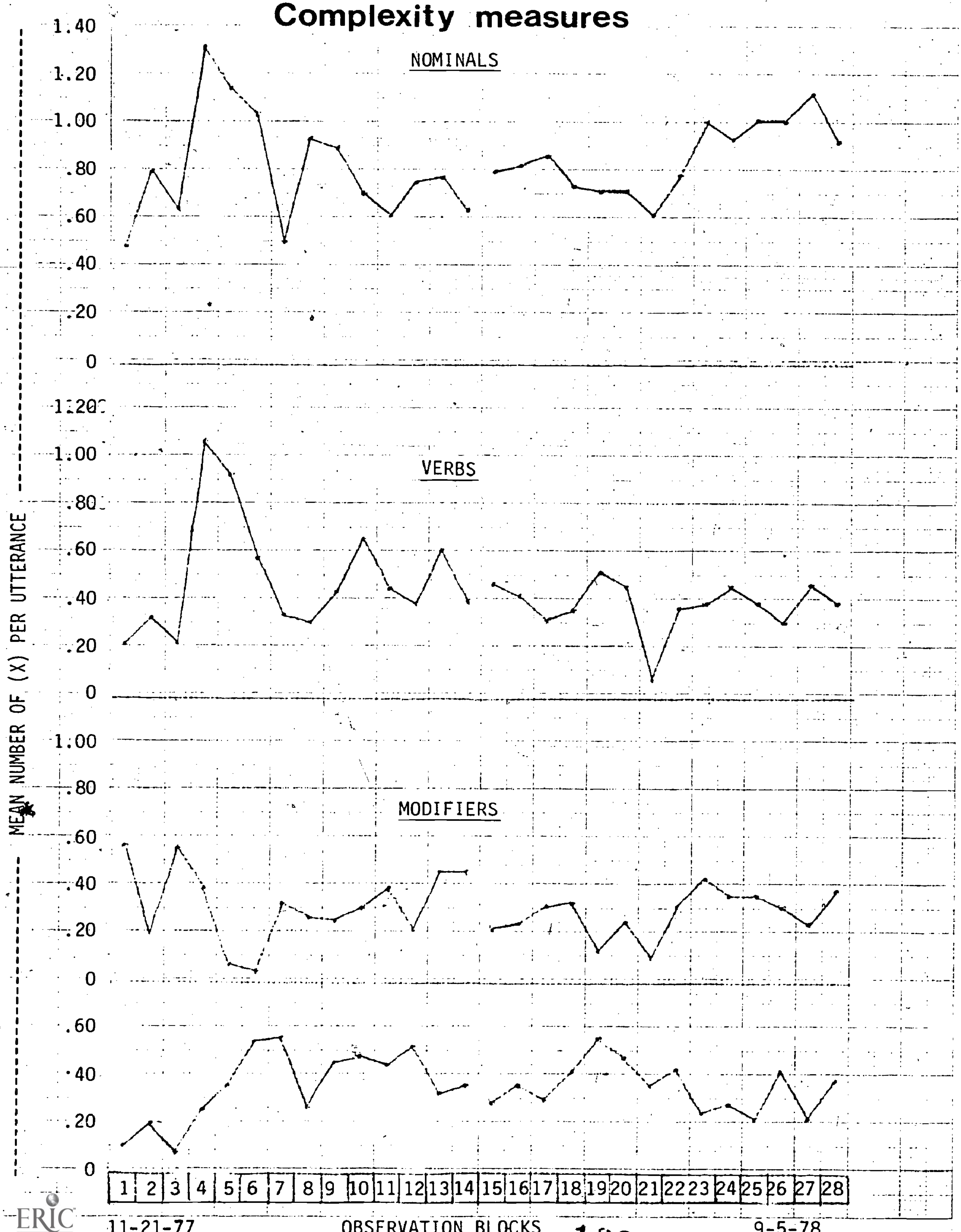


subject: KM

site: KNI

Figure 35

# Complexity measures



subject: KM  Figure 36  site: KNT

# Major categories

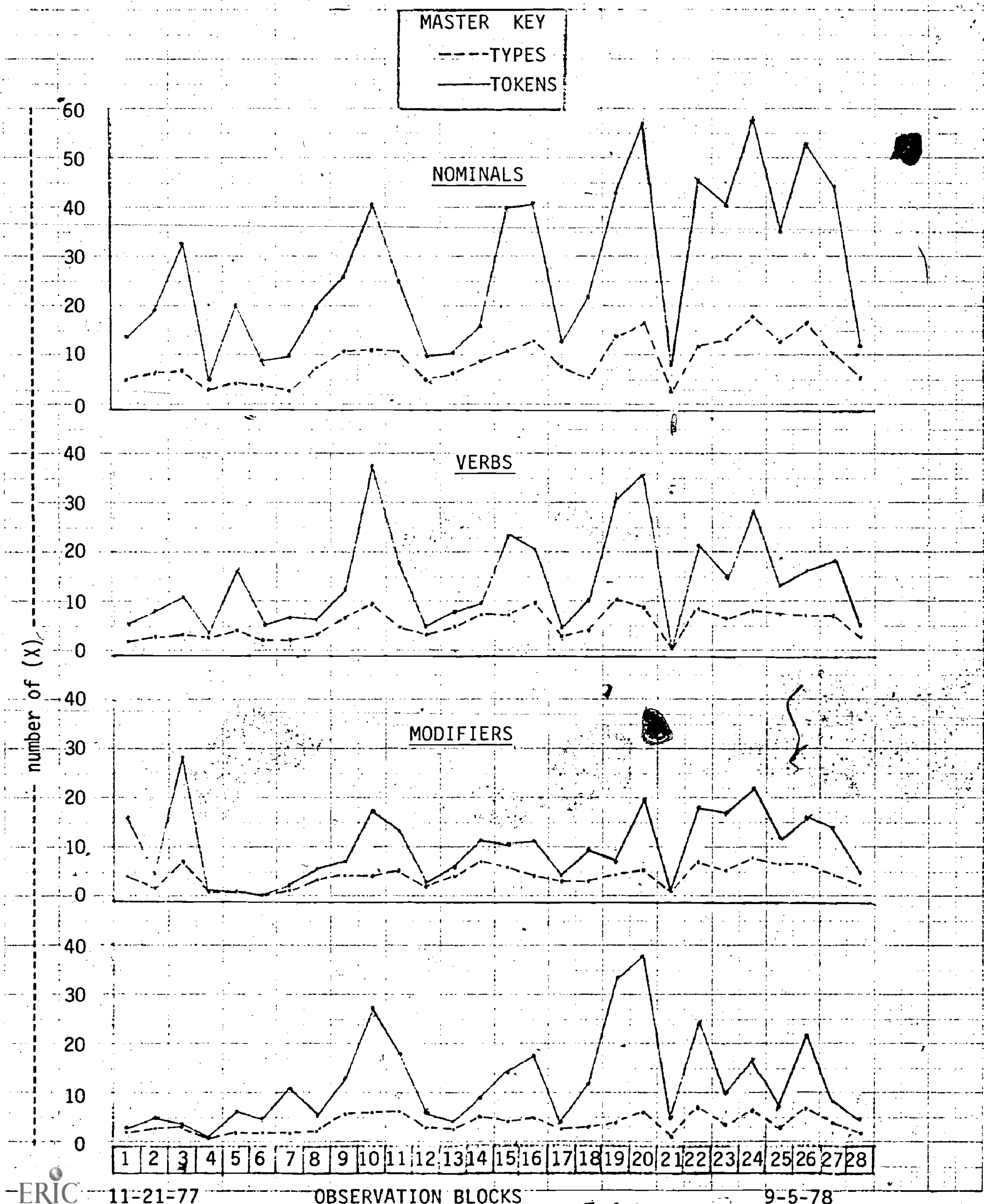
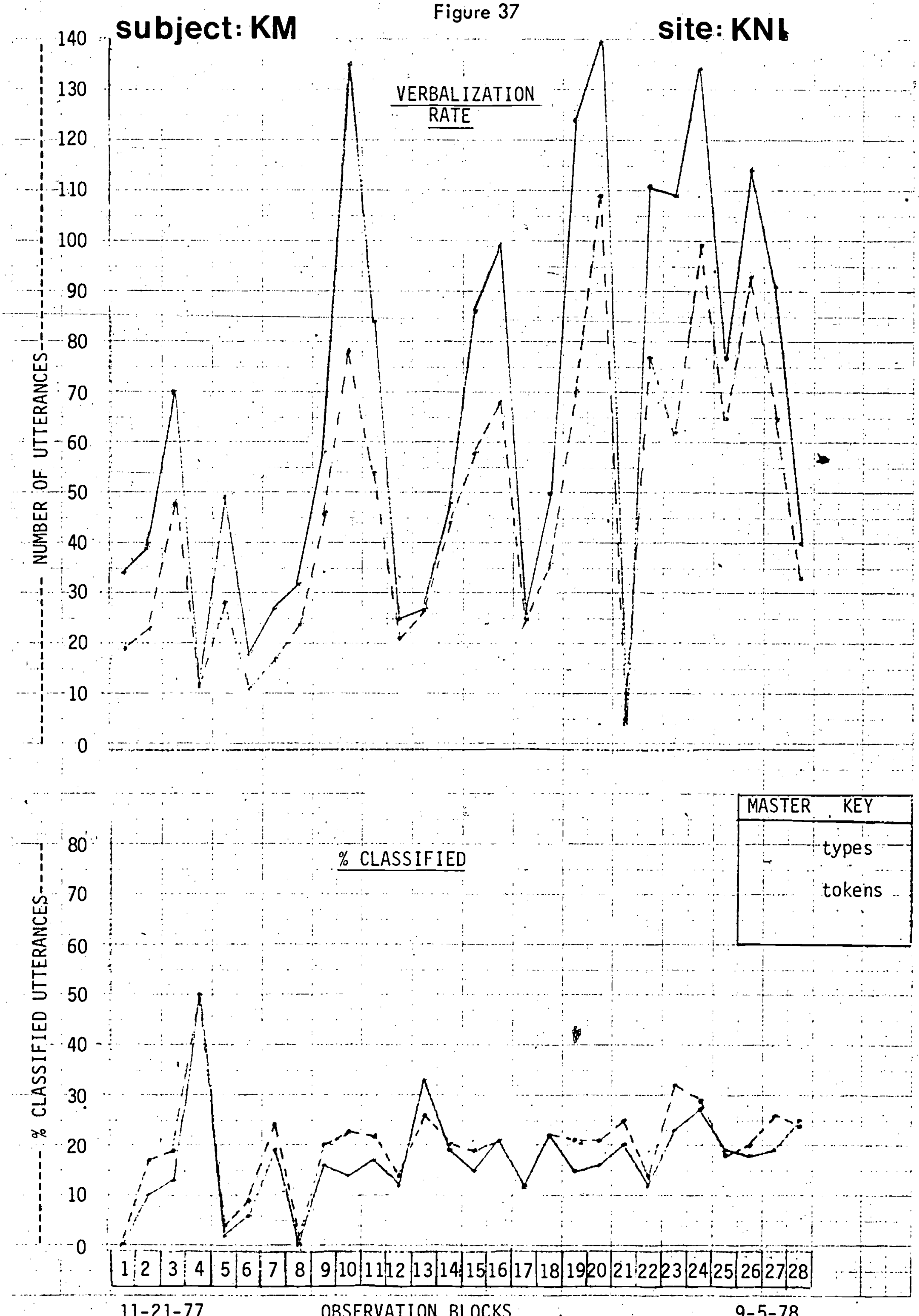


Figure 37


subject: KM
site: KNL
VERBALIZATION RATE
NUMBER OF UTTERANCES
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
% CLASSIFIED
% CLASSIFIED UTTERANCES
80
70
60
50
40
30
20
10
0
MASTER KEY
types
tokens
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
11-21-77
OBSERVATION BLOCKS
9-5-78

7.

Subject: S.I.

Site: KNI

Figures 39 through 43

subject: SI

Complexity Measures

site: KNI

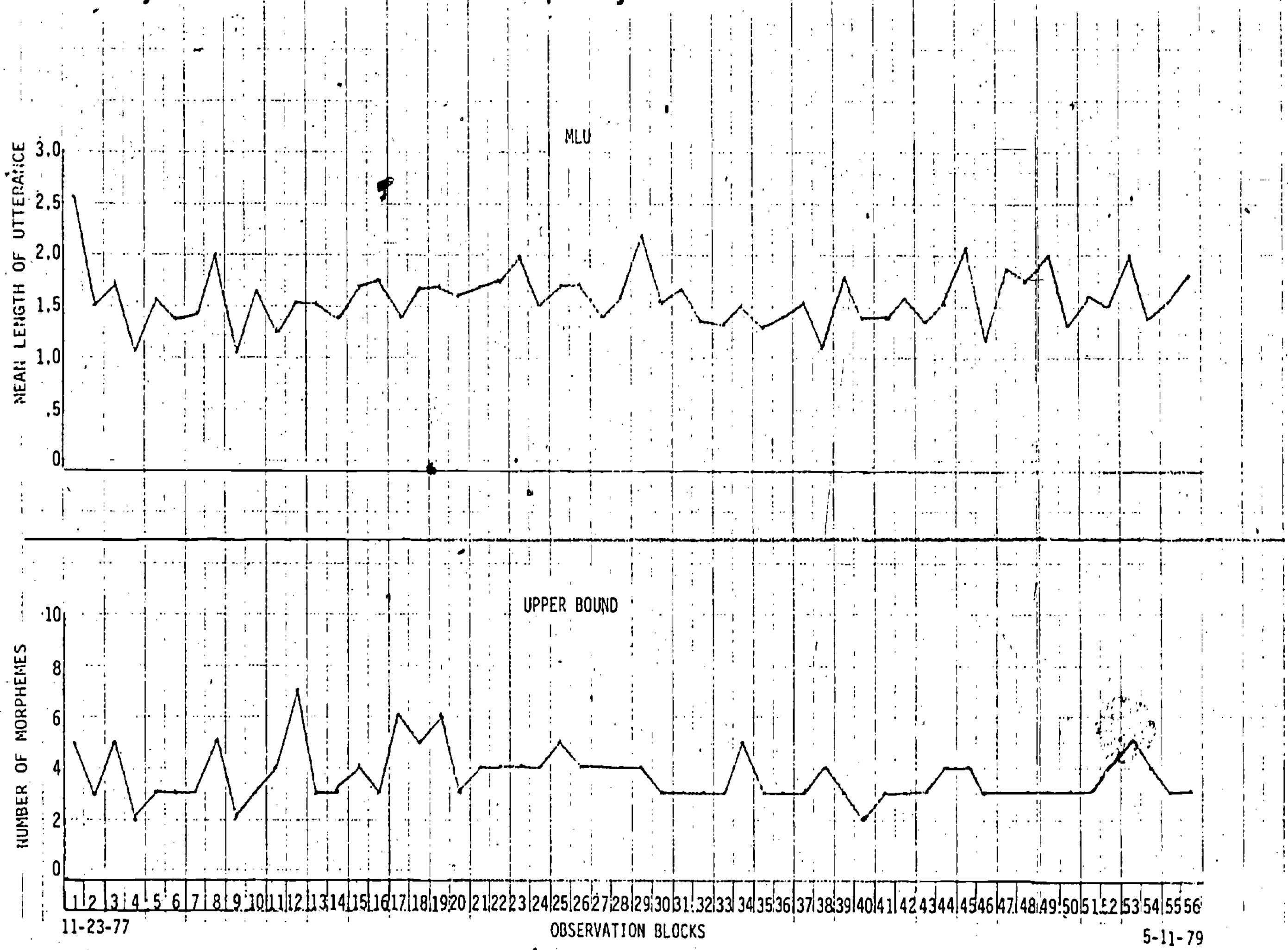



Figure 39

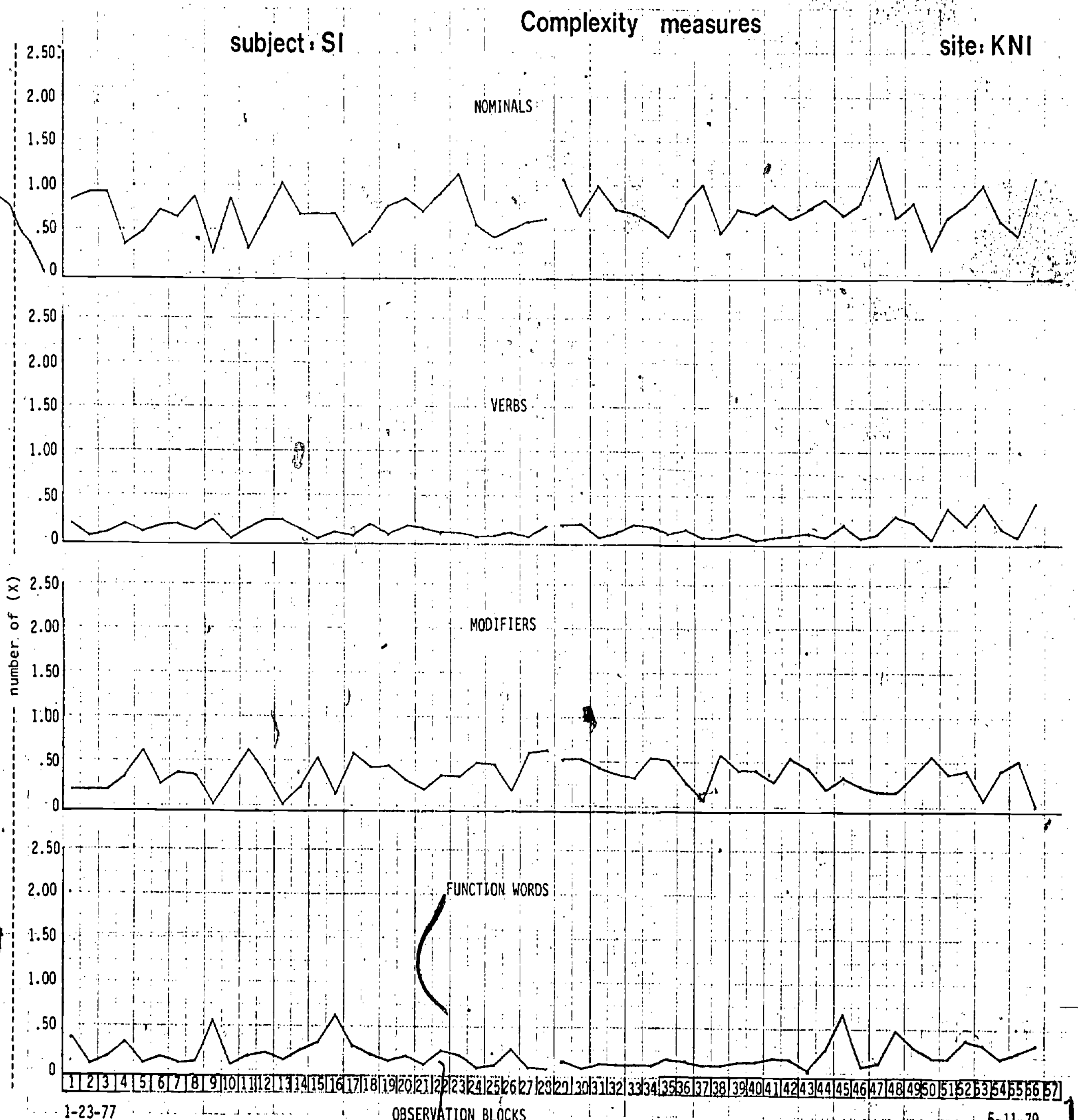

Complexity measures
subject: SI
site: KNI
NOMINALS
VERBS
MODIFIERS
FUNCTION WORDS
number of (X)
2.50
2.00
1.50
1.00
.50
0
1-23-77
OBSERVATION BLOCKS
5-11-79

Figure 40

subject: SI
Major Categories
site: KNI

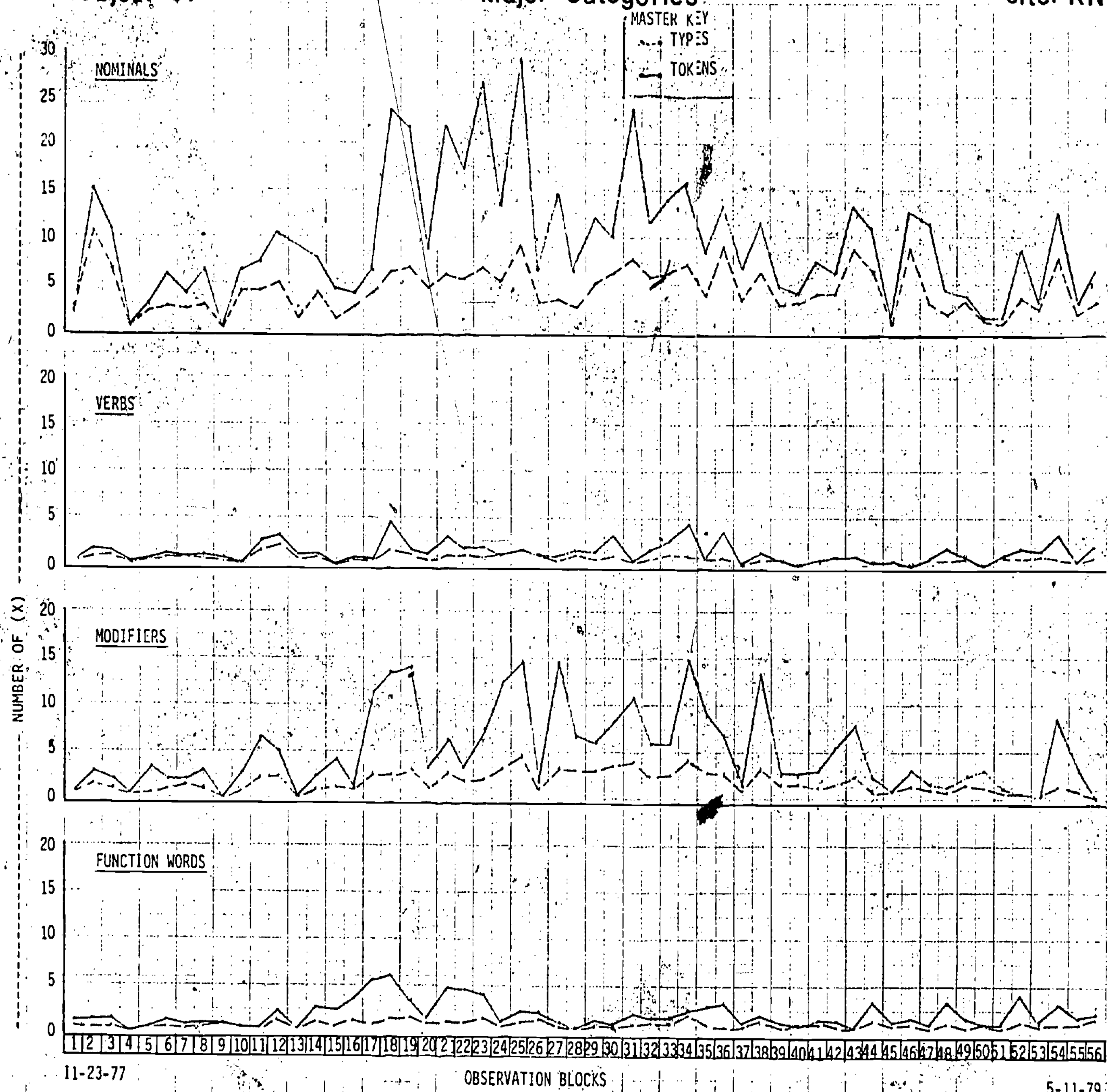
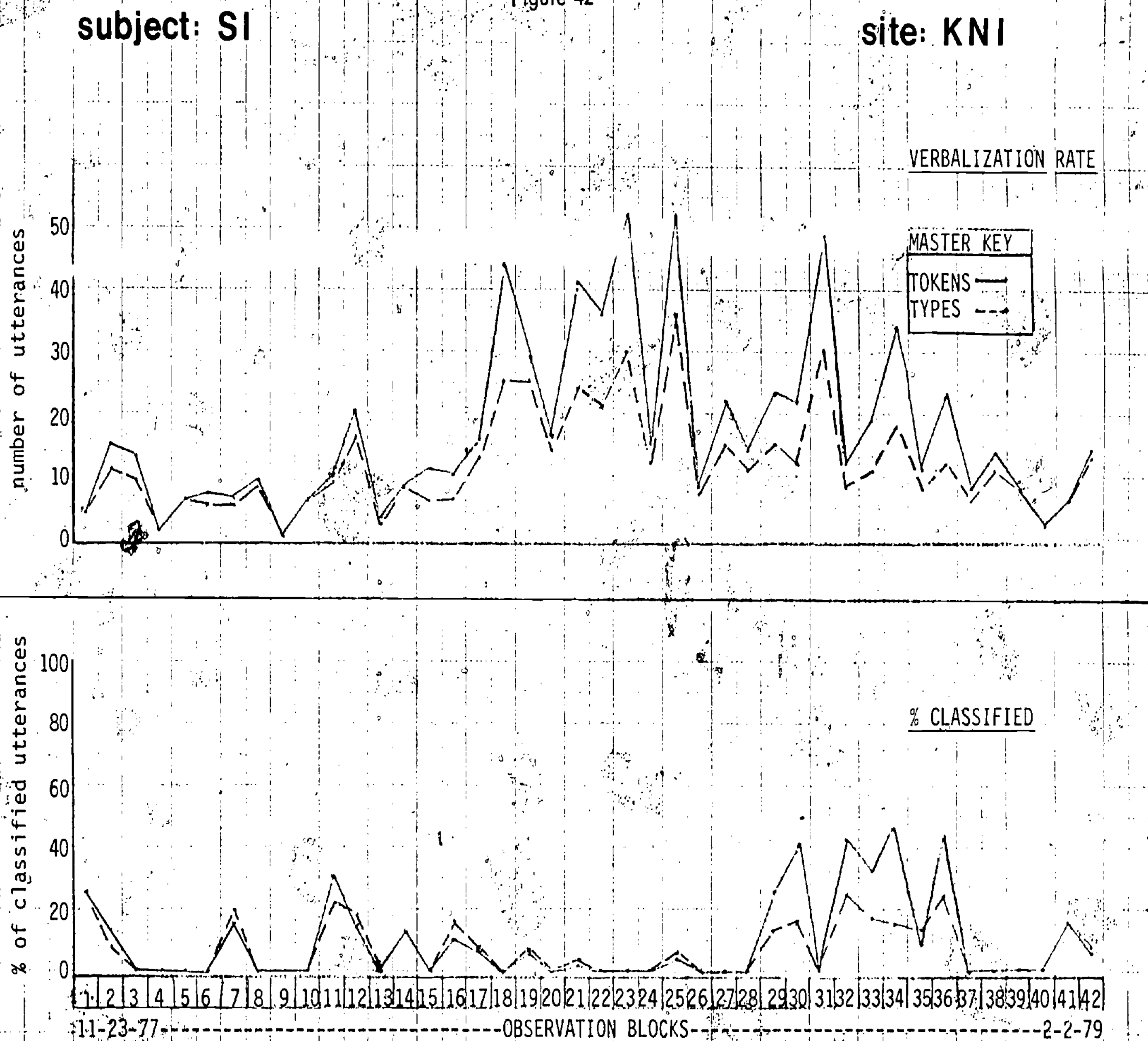



Figure 41

Figure 42

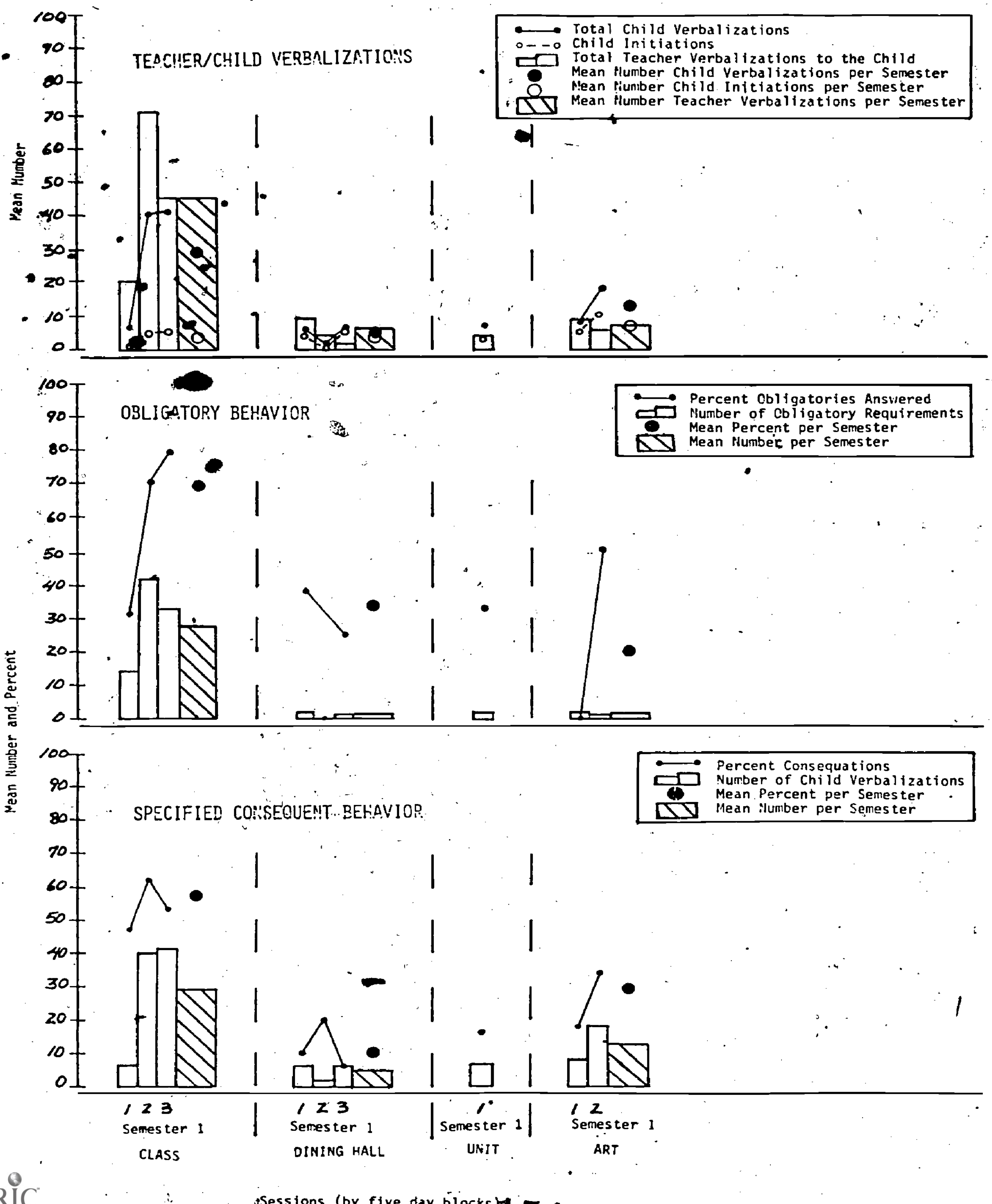

subject: SI
site: KNI
VERBALIZATION RATE
MASTER KEY
TOKENS
TYPES
number of utterances
50
40
30
20
10
0
% CLASSIFIED
% of classified utterances
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
11-23-77 OBSERVATION BLOCKS 2-2-79

# VERBAL INTERACTION ANALYSIS

Figure 43

SUBJECT: SI

SITE: KNI



Subject: T.G.

Site: KNI

Figures 44 through 48

subject:TG

Figure 44

site:KNI

# Complexity Measures

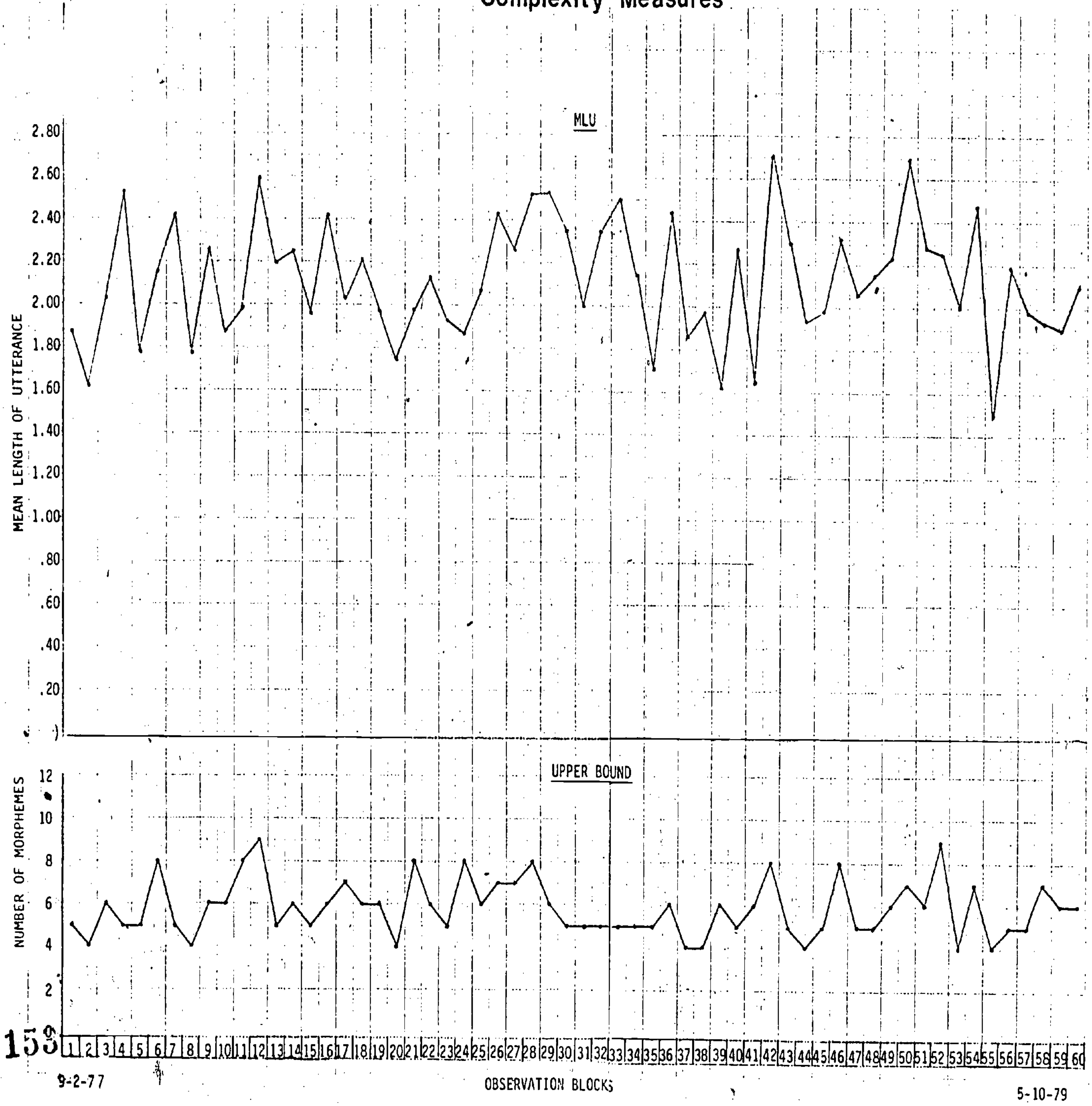
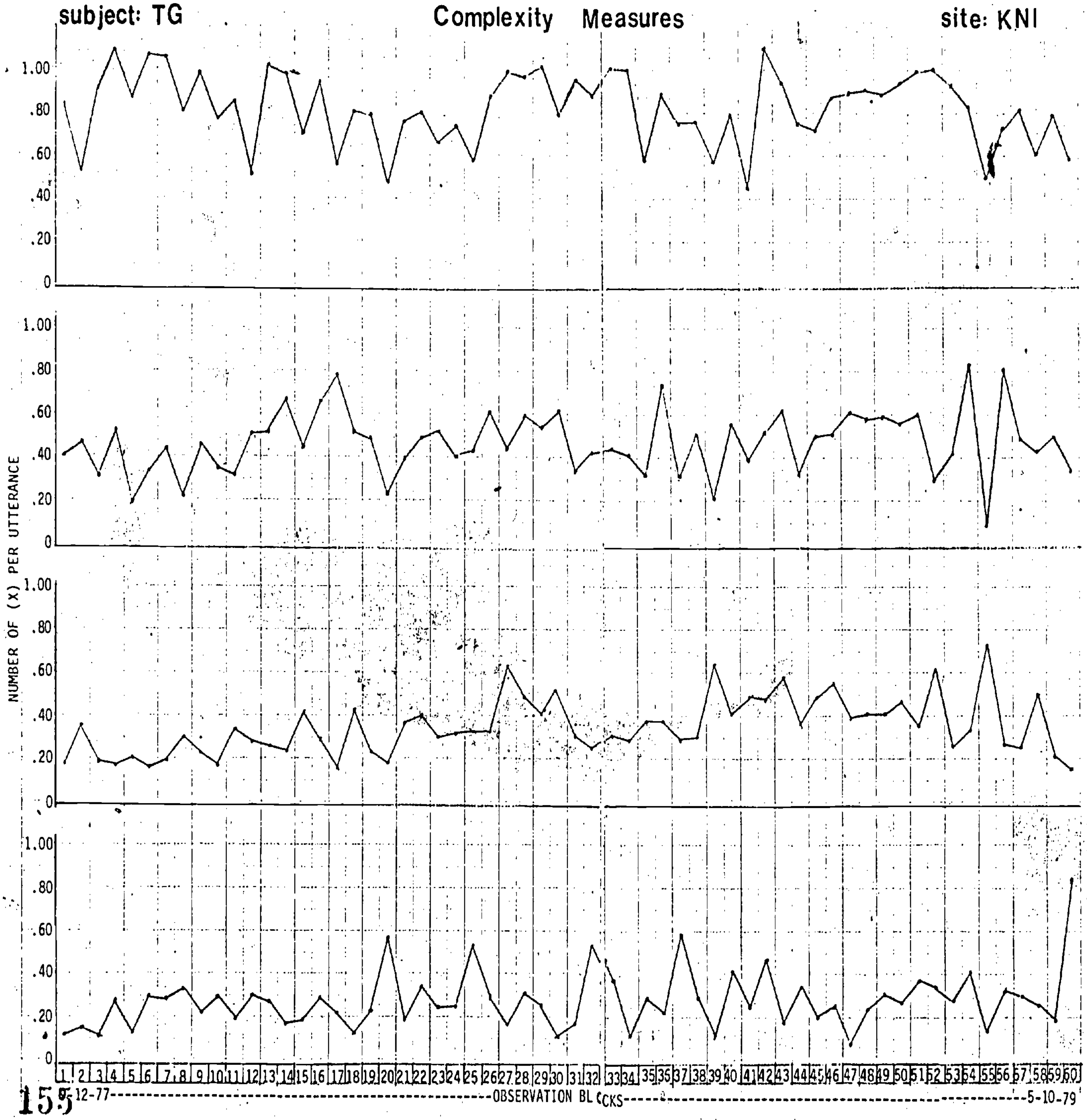


Figure 45




155

subject: TG

Figure 46

Major Categories

site: KNI

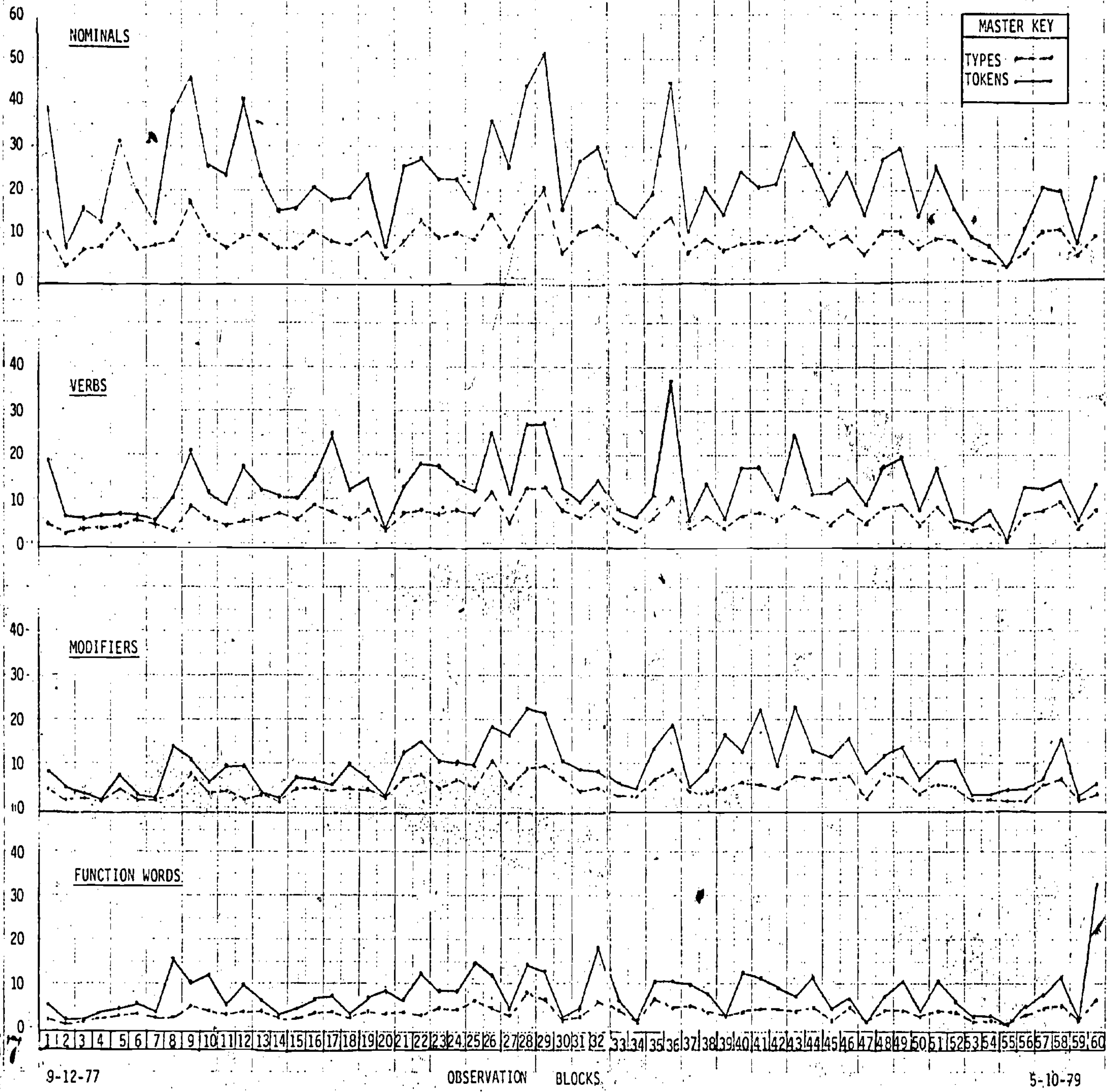
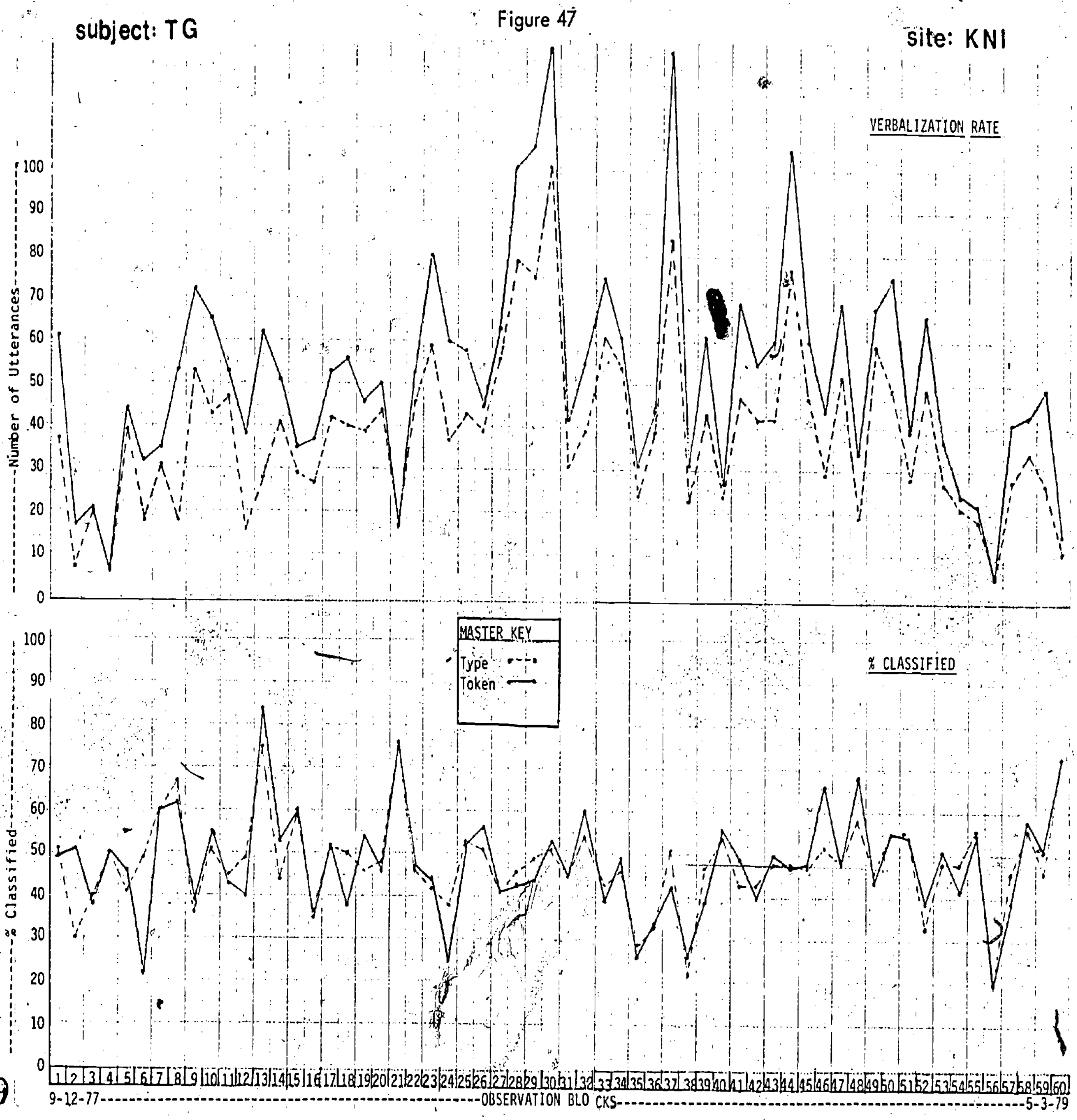


Figure 47



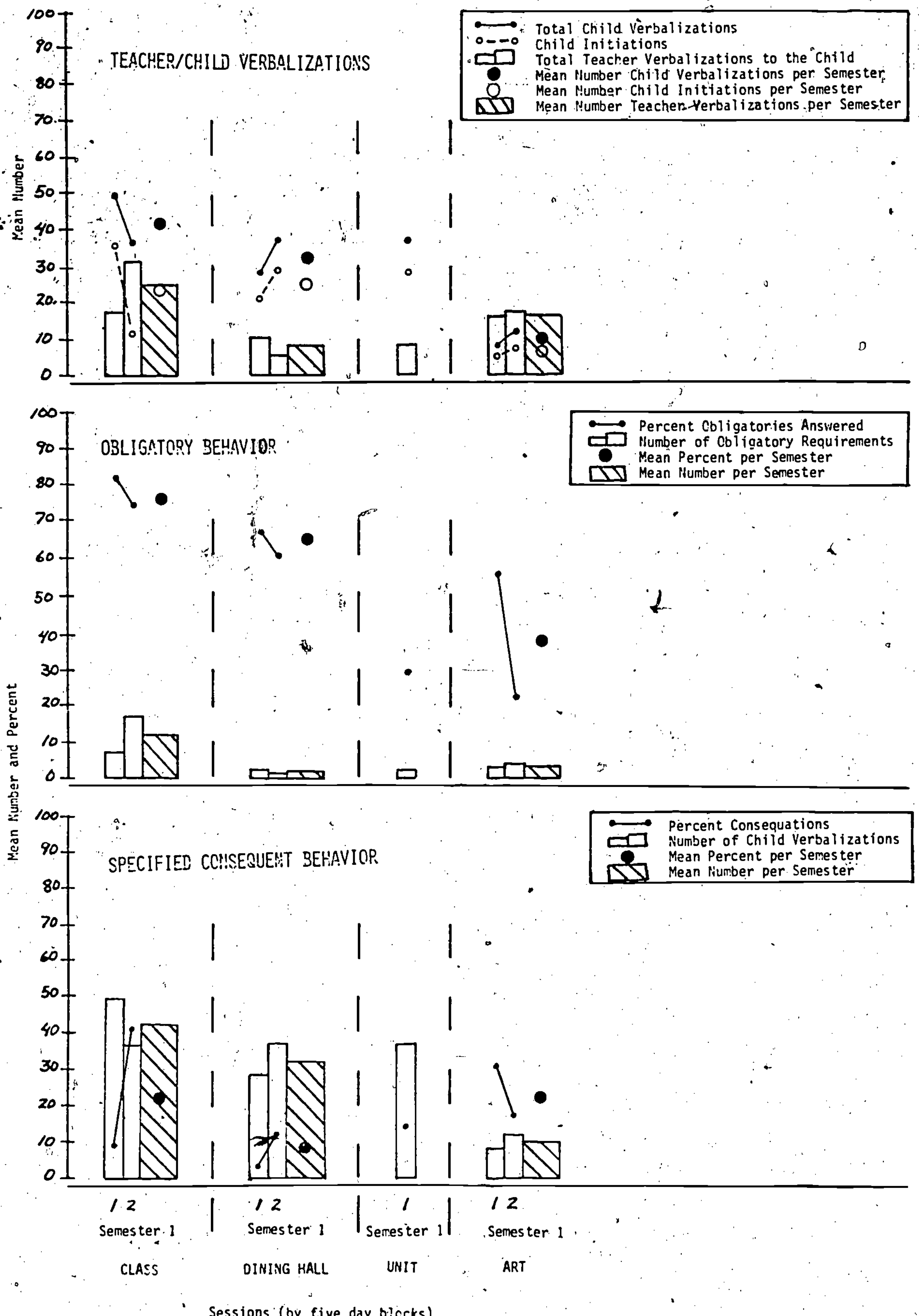
subject: TG
site: KNI
VERBALIZATION RATE
Number of Utterances
% CLASSIFIED
% Classified
MASTER KEY
Type
Token
9-12-77
OBSERVATION BLOCKS
5-3-79

## VERBAL INTERACTION ANALYSIS

Figure 48

SUBJECT: TG

SITE: KNI

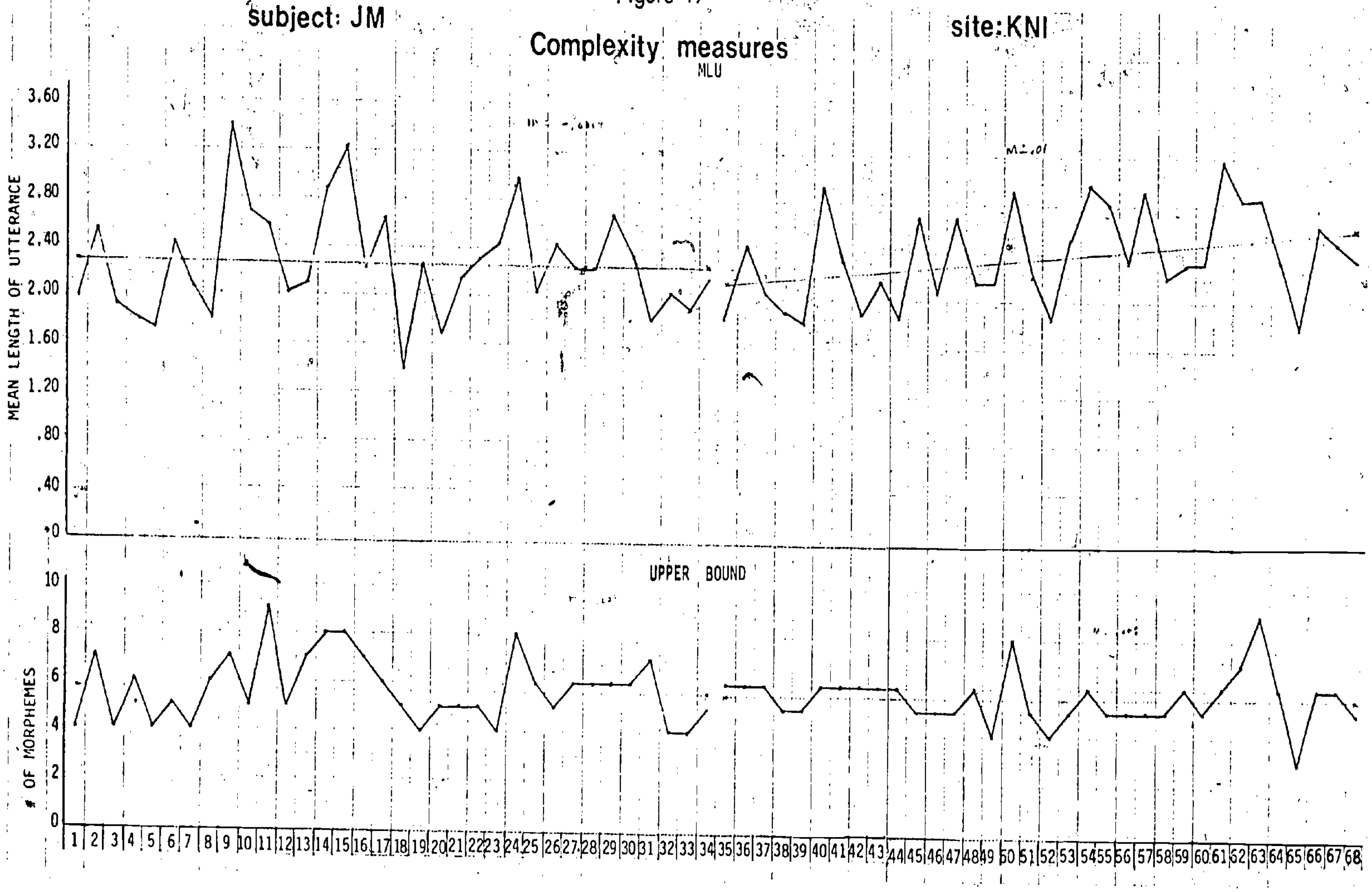


Subject: J.M.

Site: KNI

Figures 49 through 53

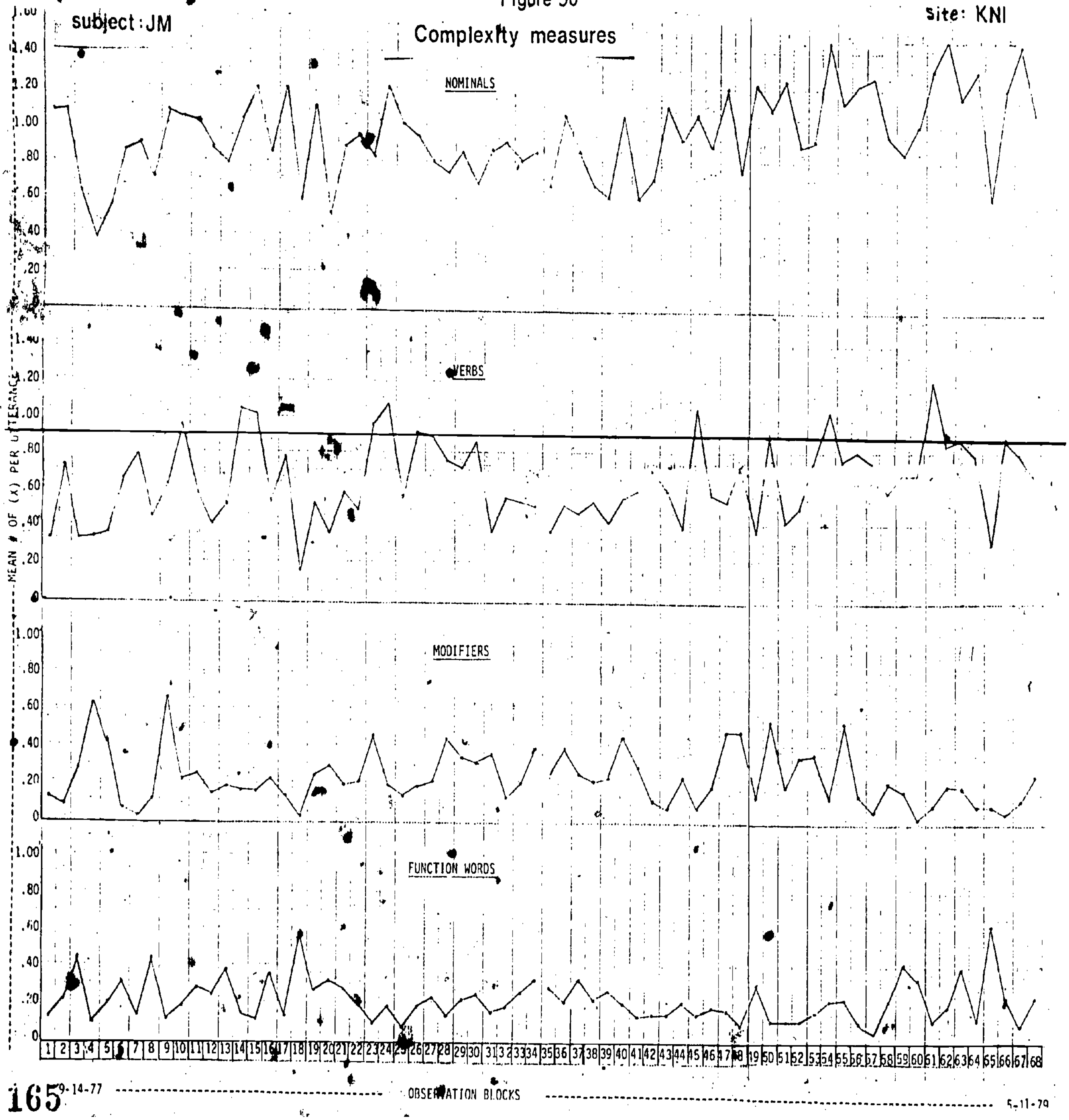
Figure 49



subject: JM
Complexity measures
site: KNI
MLU
MEAN LENGTH OF UTTERANCE
3.60
3.20
2.80
2.40
2.00
1.60
1.20
.80
.40
0
UPPER BOUND
# OF MORPHEMES
10
8
6
4
2
0

Figure 50

Complexity measures



SUBJECT: JM

Figure 51

MAJOR CATEGORIES

SITE: KNI

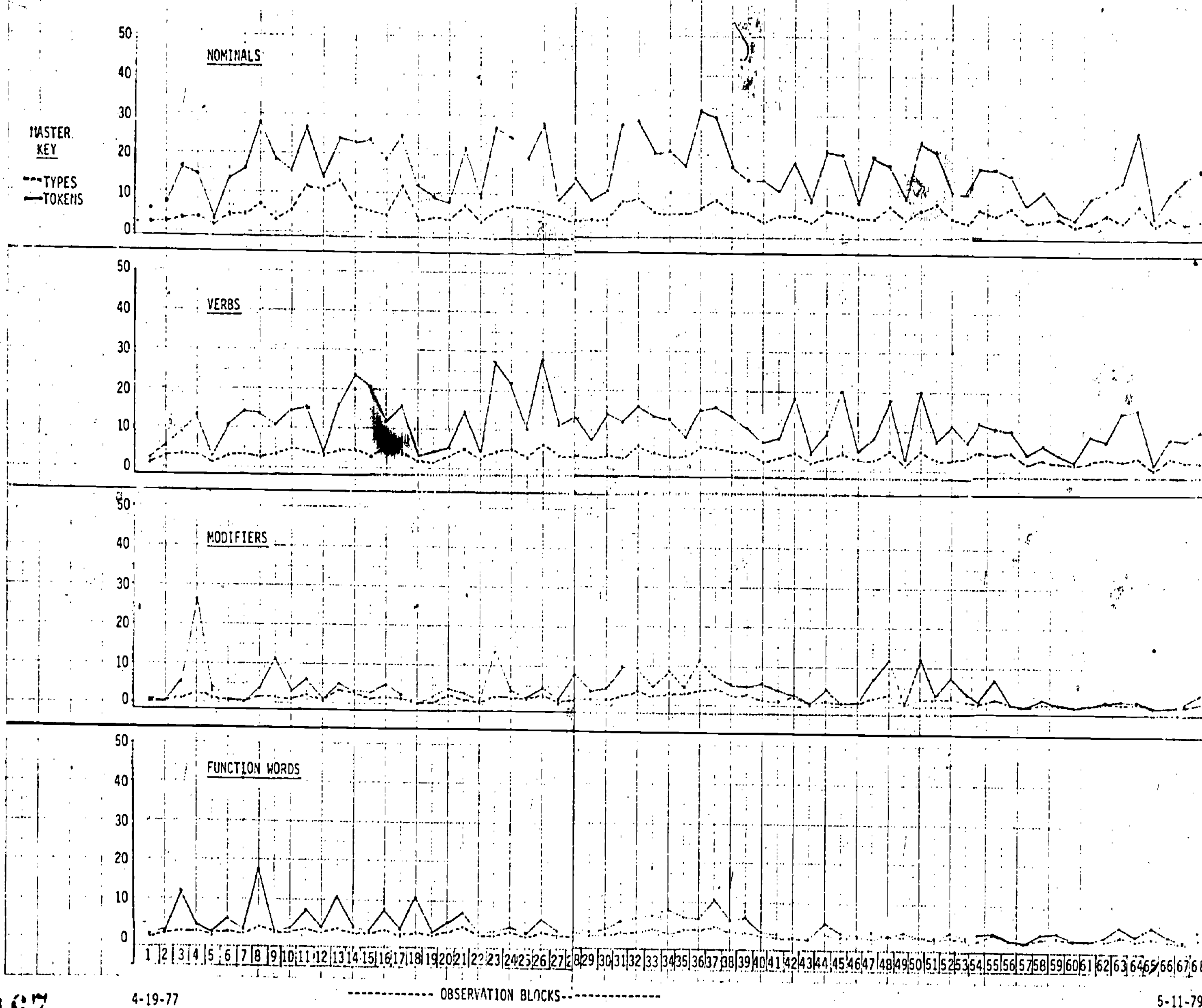
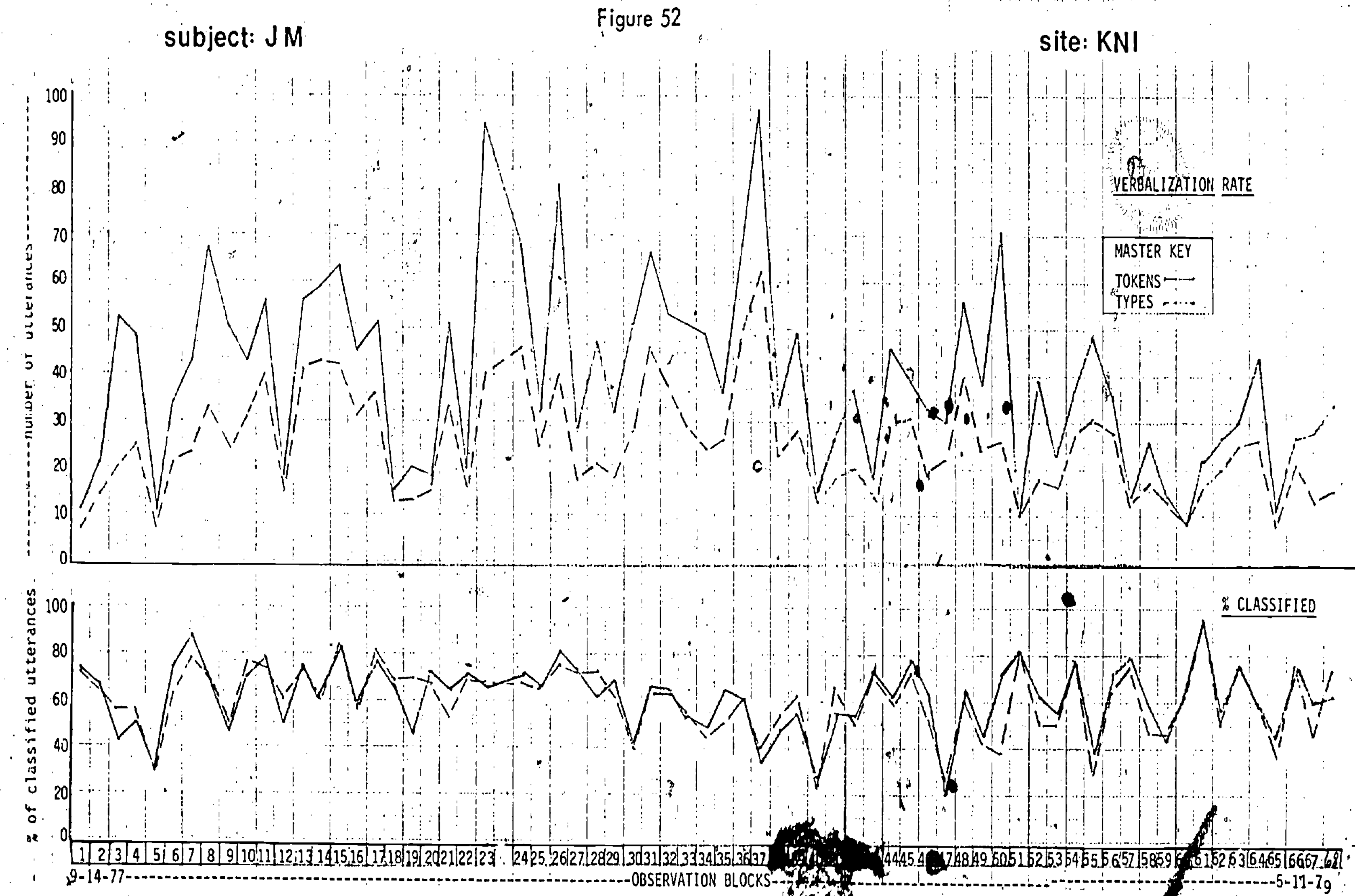


Figure 52

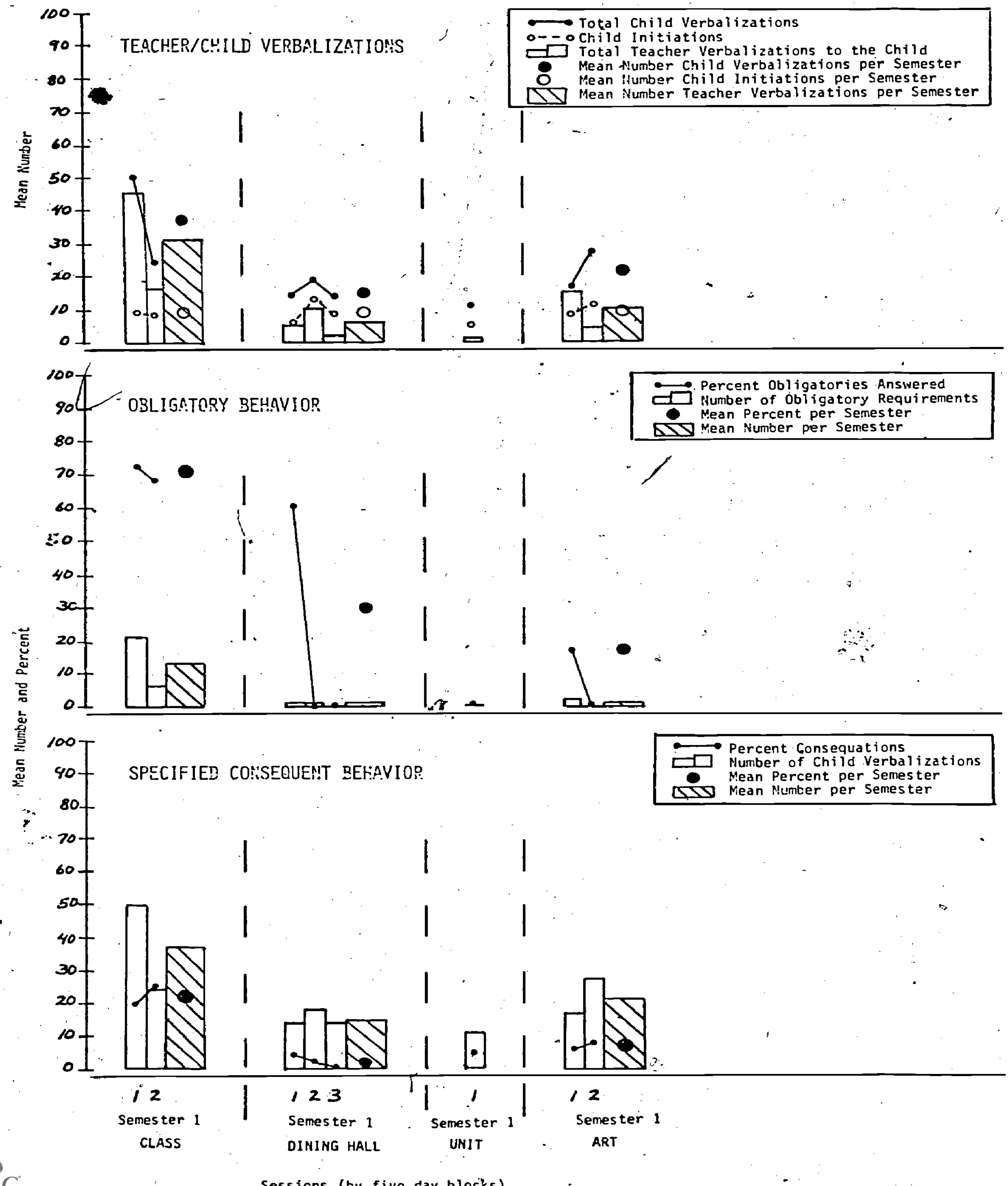


subject: JM
site: KNI
VERBALIZATION RATE
MASTER KEY
TOKENS
TYPES
% CLASSIFIED
number of utterances
% of classified utterances
9-14-77
OBSERVATION BLOCKS
5-11-79

# VERBAL INTERACTION ANALYSIS

Figure 53

SUBJECT: JM SITE: KNI



Lawrence Data

Subject: D.K.

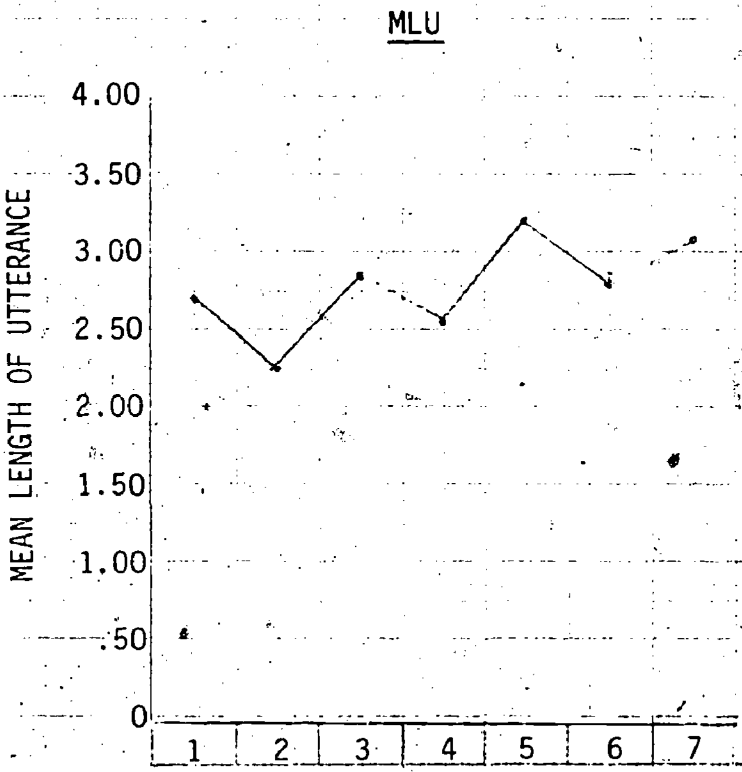
Site: Lawrence

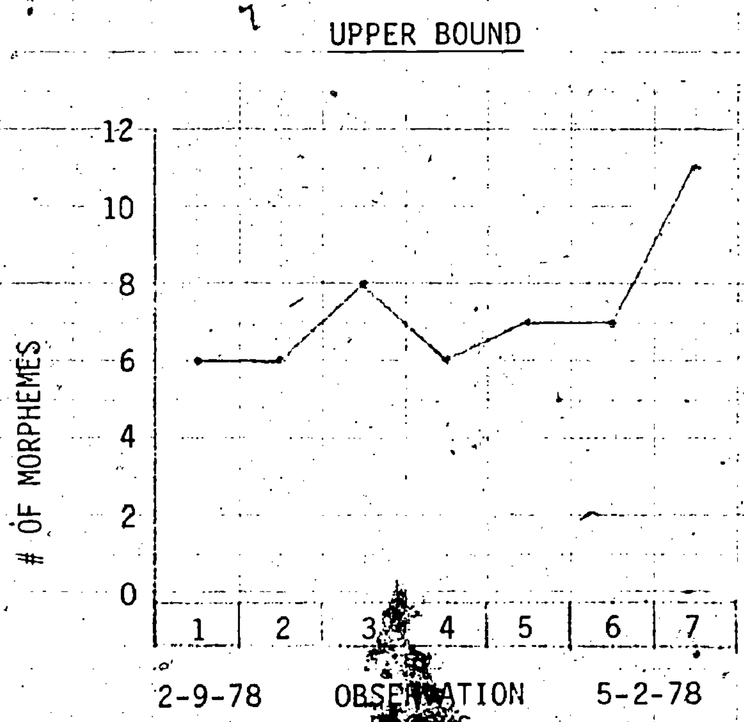
Figures 54 through 57.

Figure 54

# Complexity measures

**subject: DK** **site: Lawr.**




Figure

Figure 55

## Complexity measures

**subject: DK** **site: Lawr.**

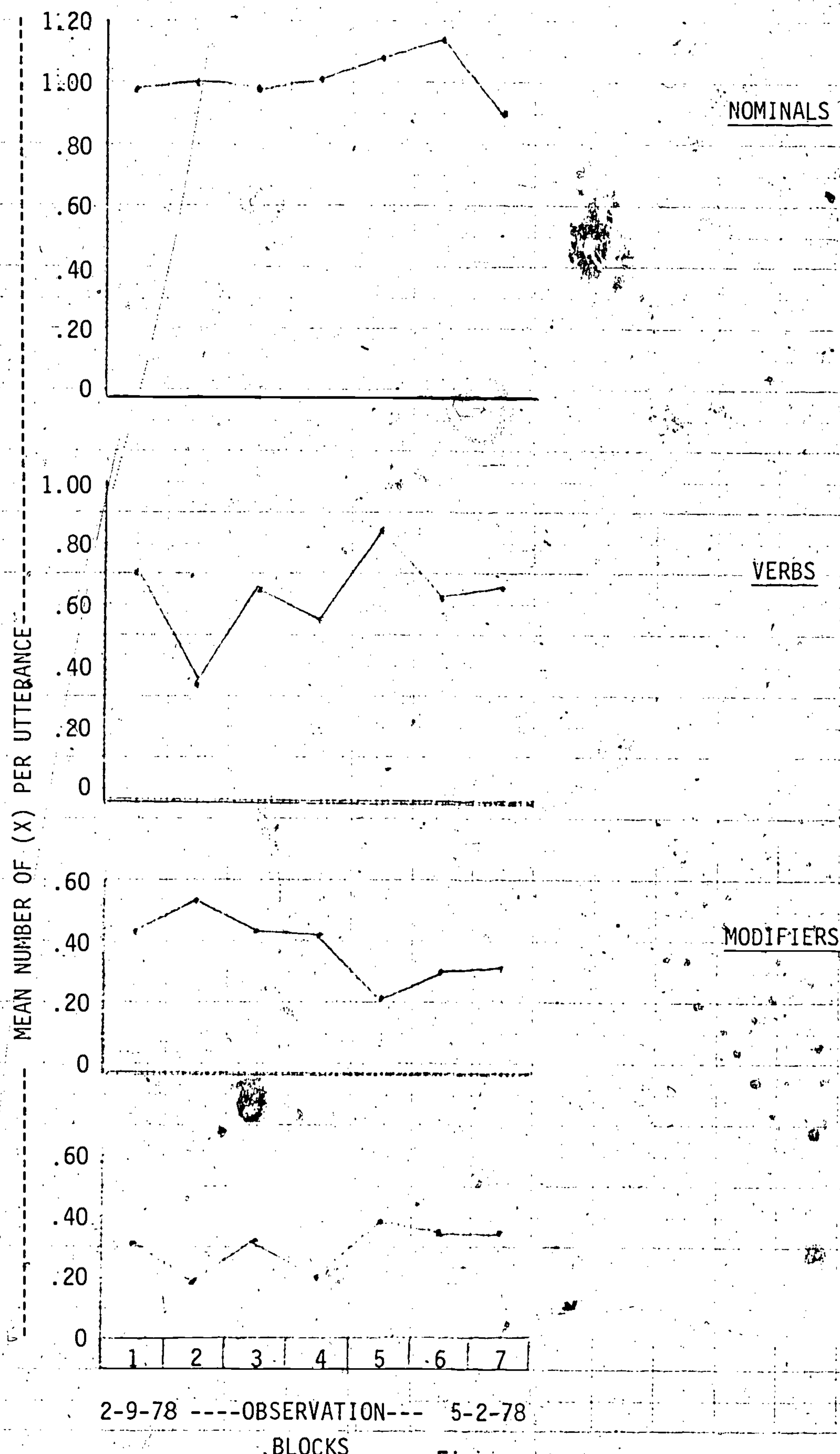
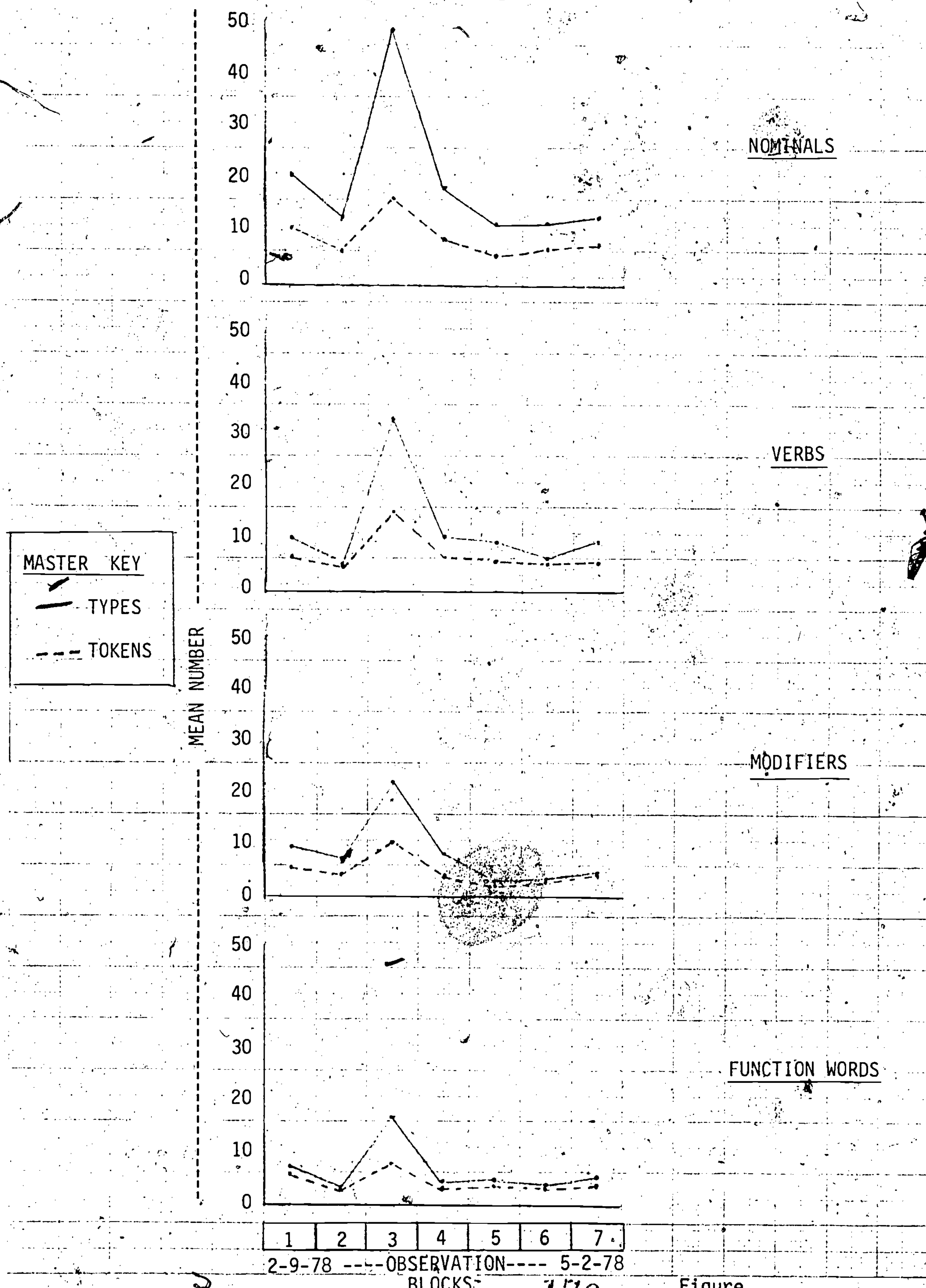


Figure 56

# Major categories

subject: DK | site: Lawr.



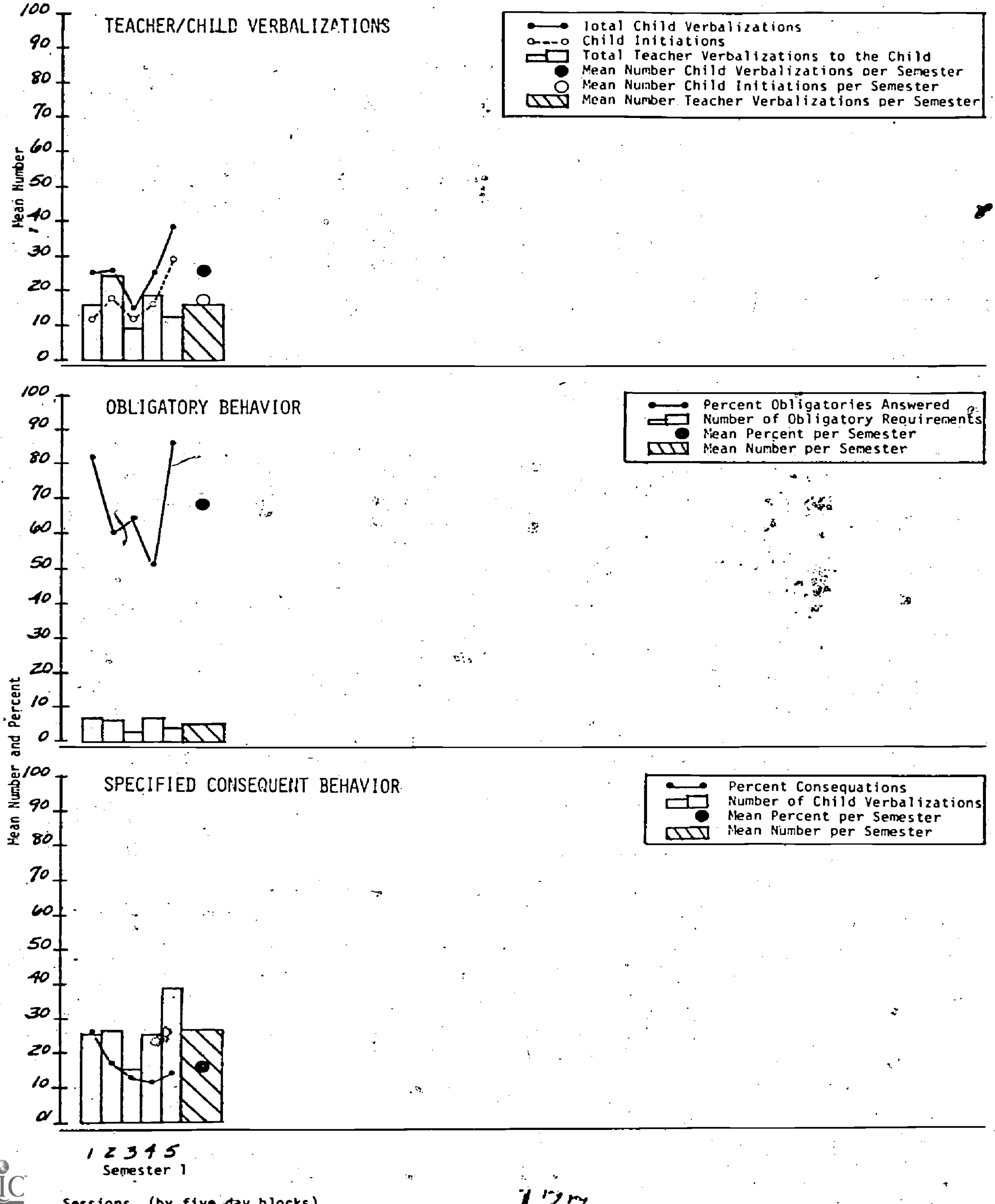



Figure

Figure 57

# VERBAL INTERACTION ANALYSIS

SUBJECT: DH SITE: LAWRENCE



Subject: K.S.

Site: Lawrence

Figures 58 through 62

SUBJECT: KS SITE: LAWR.

Figure 58

# COMPLEXITY MEASURES

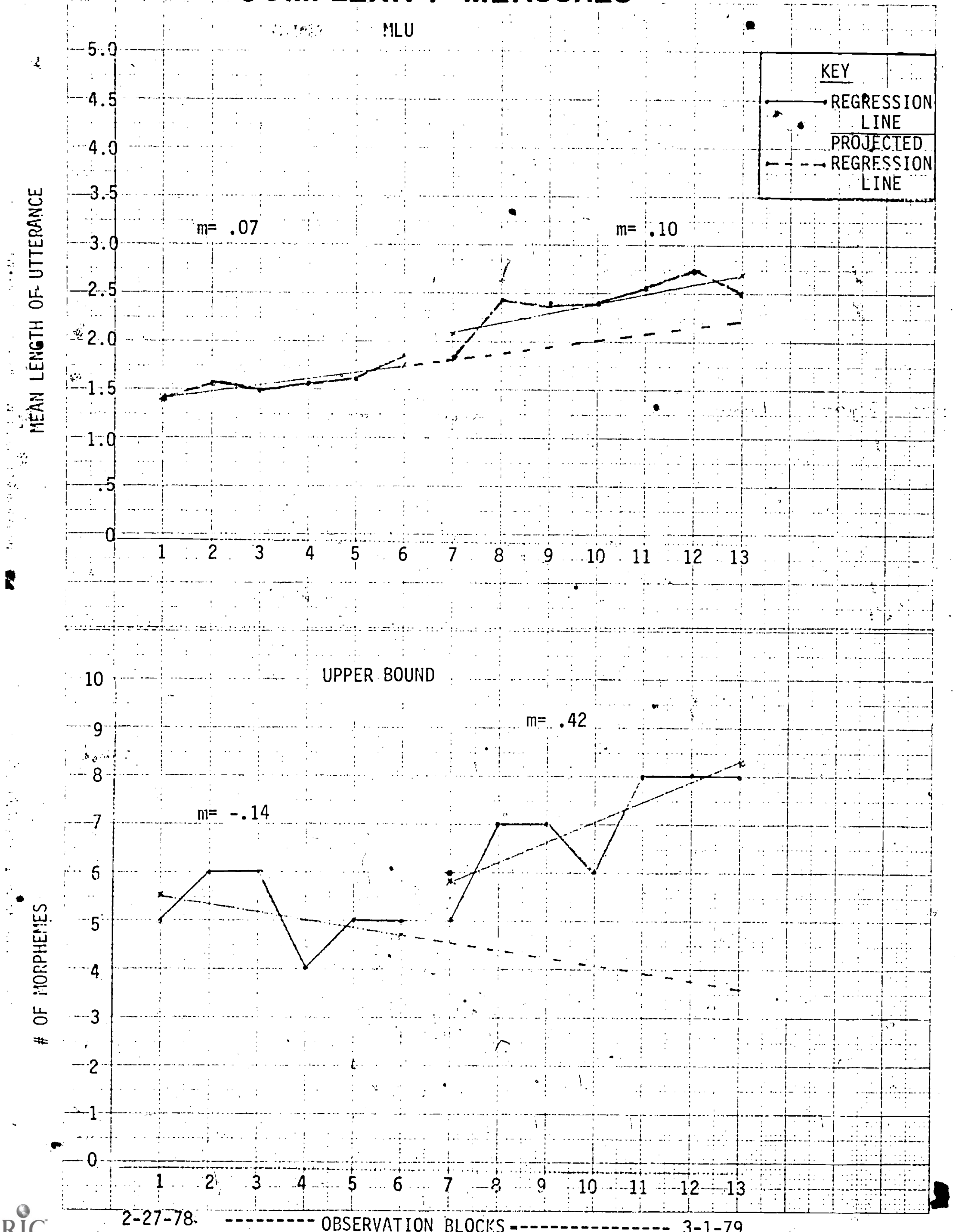


Figure 59

# COMPLEXITY MEASURES

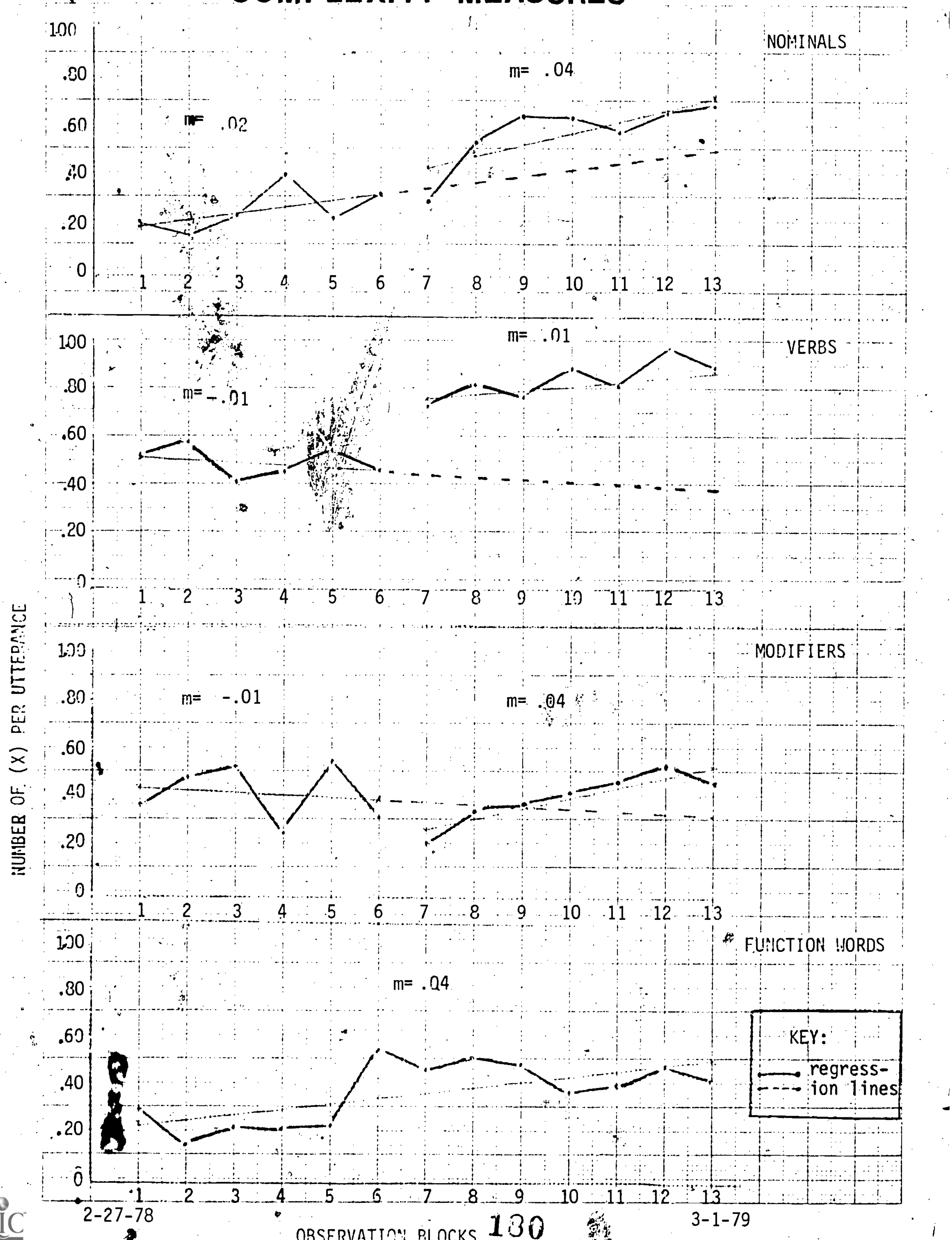


Figure 60

# MAJOR CATEGORIES

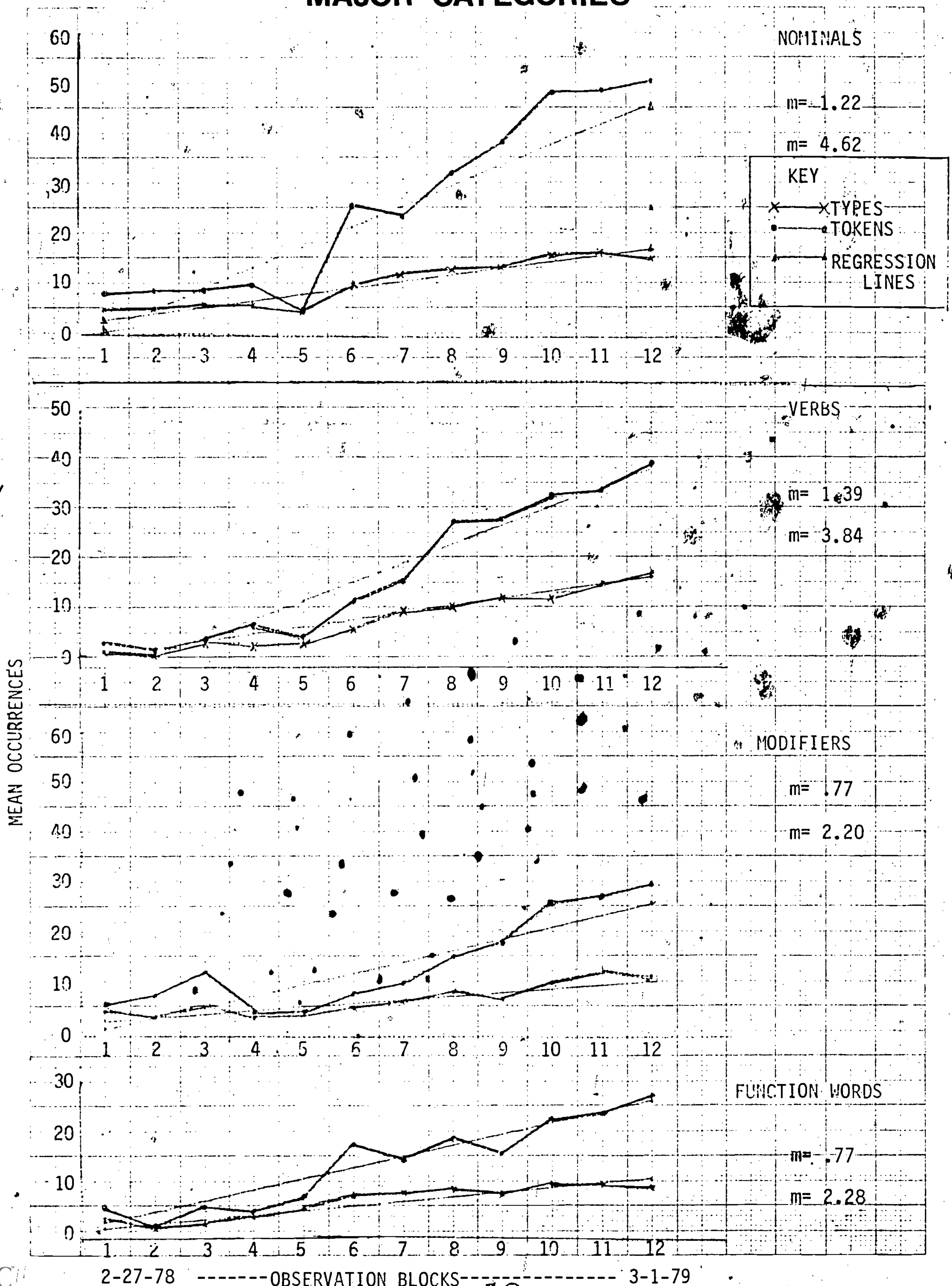
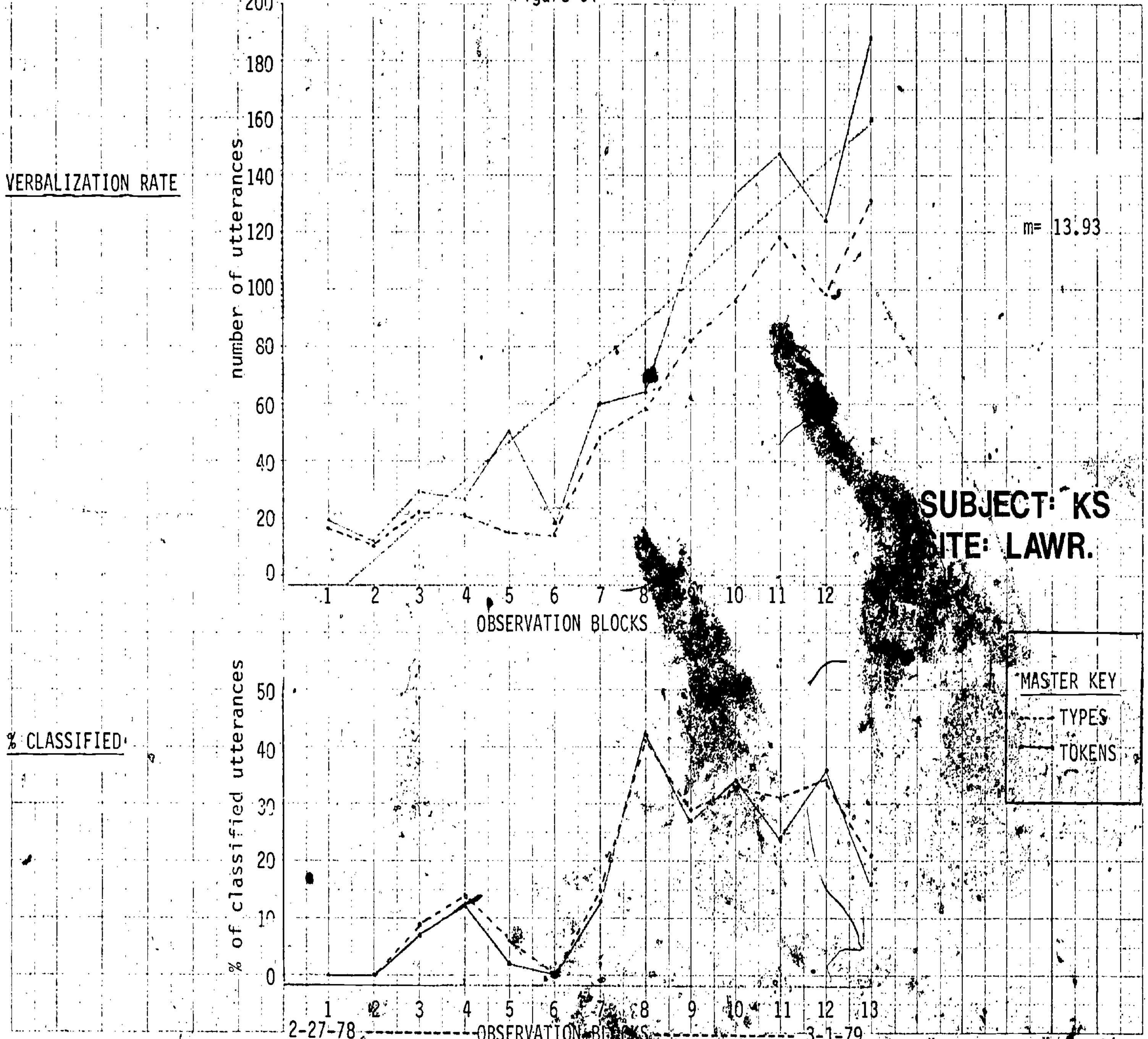


Figure 61



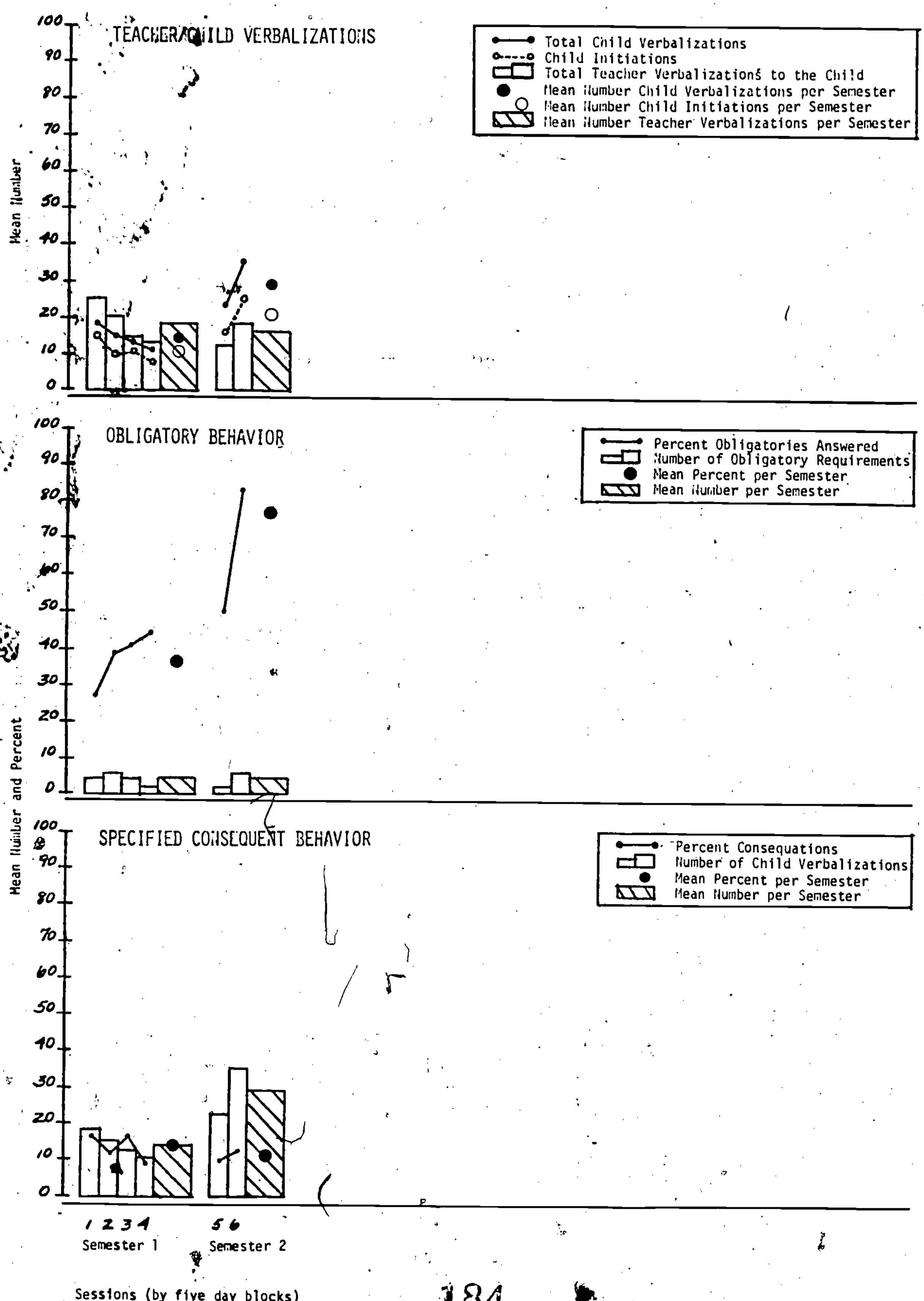
VERBALIZATION RATE
number of utterances
200
180
160
140
120
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12
OBSERVATION BLOCKS
m= 13.93
SUBJECT: KS
SITE: LAWR.
% CLASSIFIED
% of classified utterances
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13
2-27-78 OBSERVATION BLOCKS 3-1-79
MASTER KEY
TYPES
TOKENS

Figure 62

# VERBAL INTERACTION ANALYSIS

SUBJECT: KS

SITE: LAWRENCE



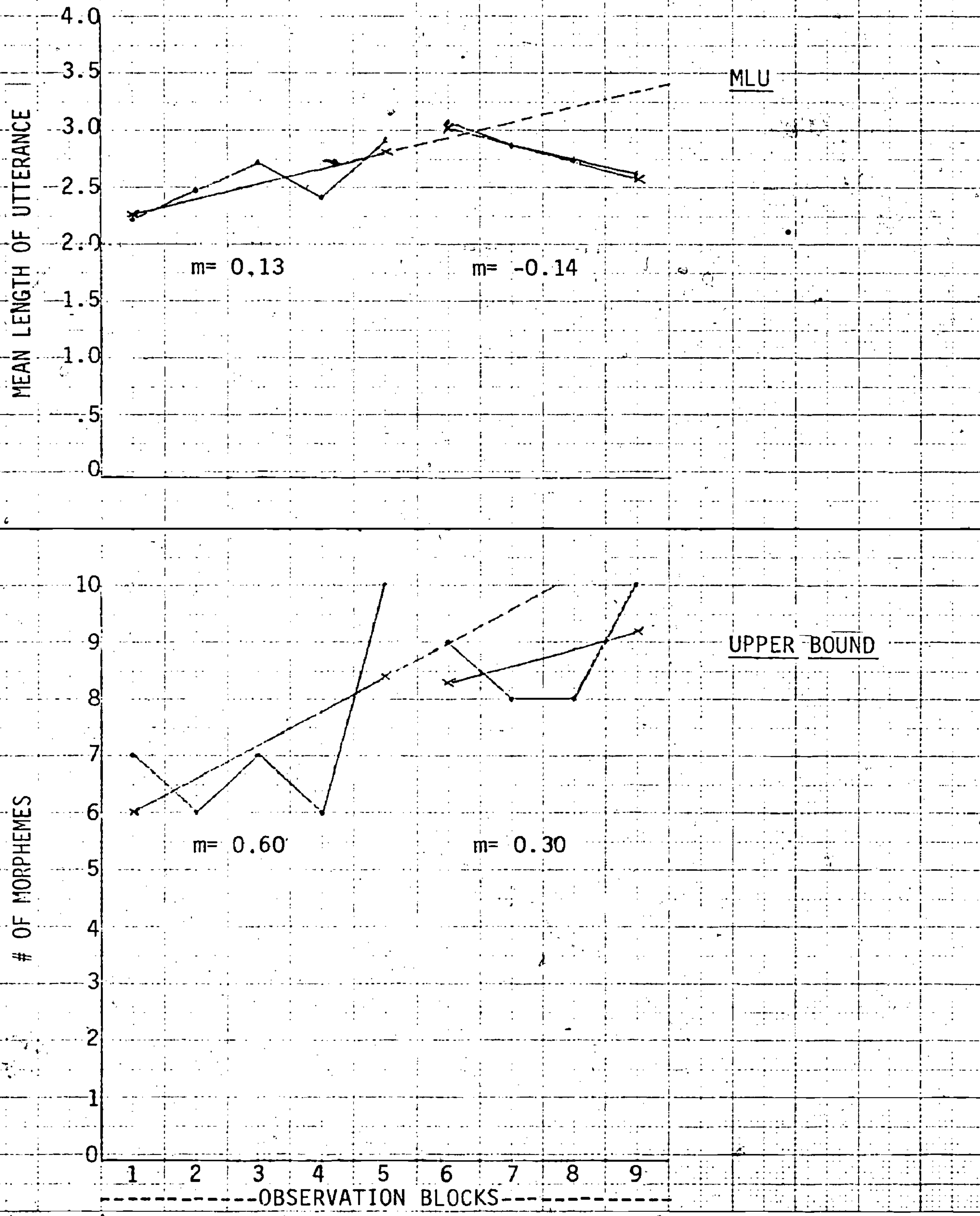
Subject: C.Z.

Site: Lawrence

Figures 63 through 67

SUBJECT: CZ  Figure 63  SITE: LAWR

# COMPLEXITY MEASURES

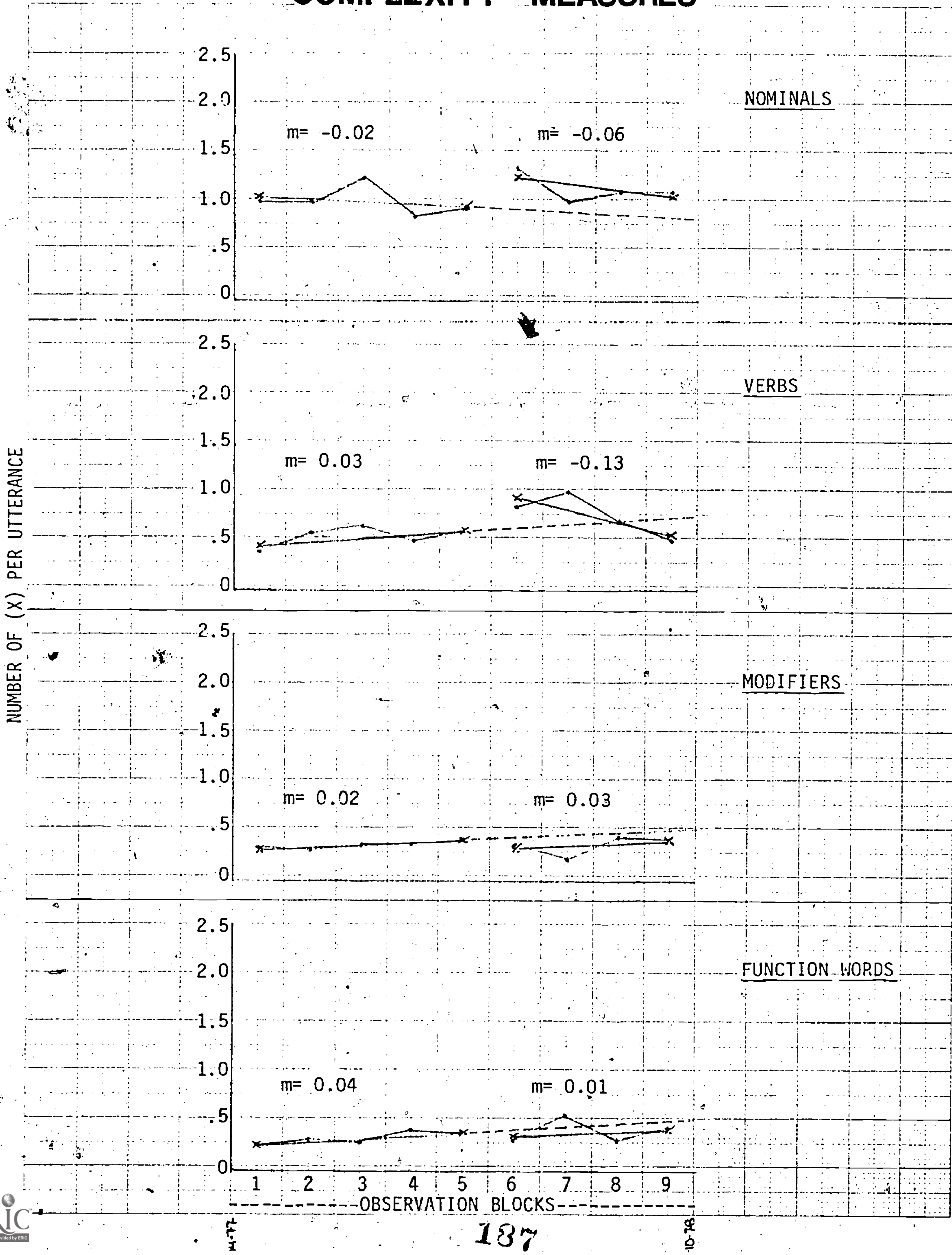


SUBJECT: CZ

Figure 64

SITE: LAWR

# COMPLEXITY MEASURES



MAJOR CATEGORIES

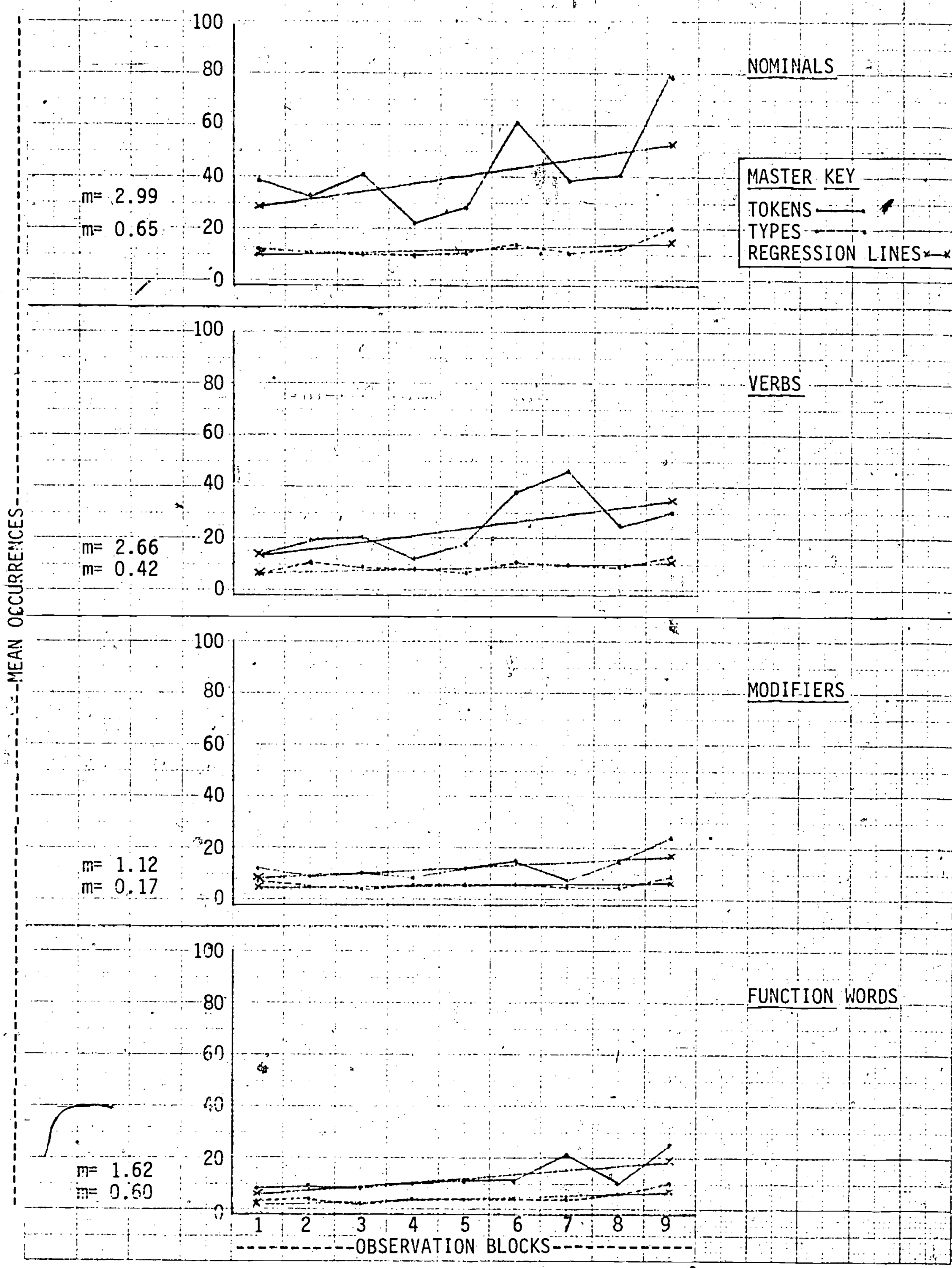
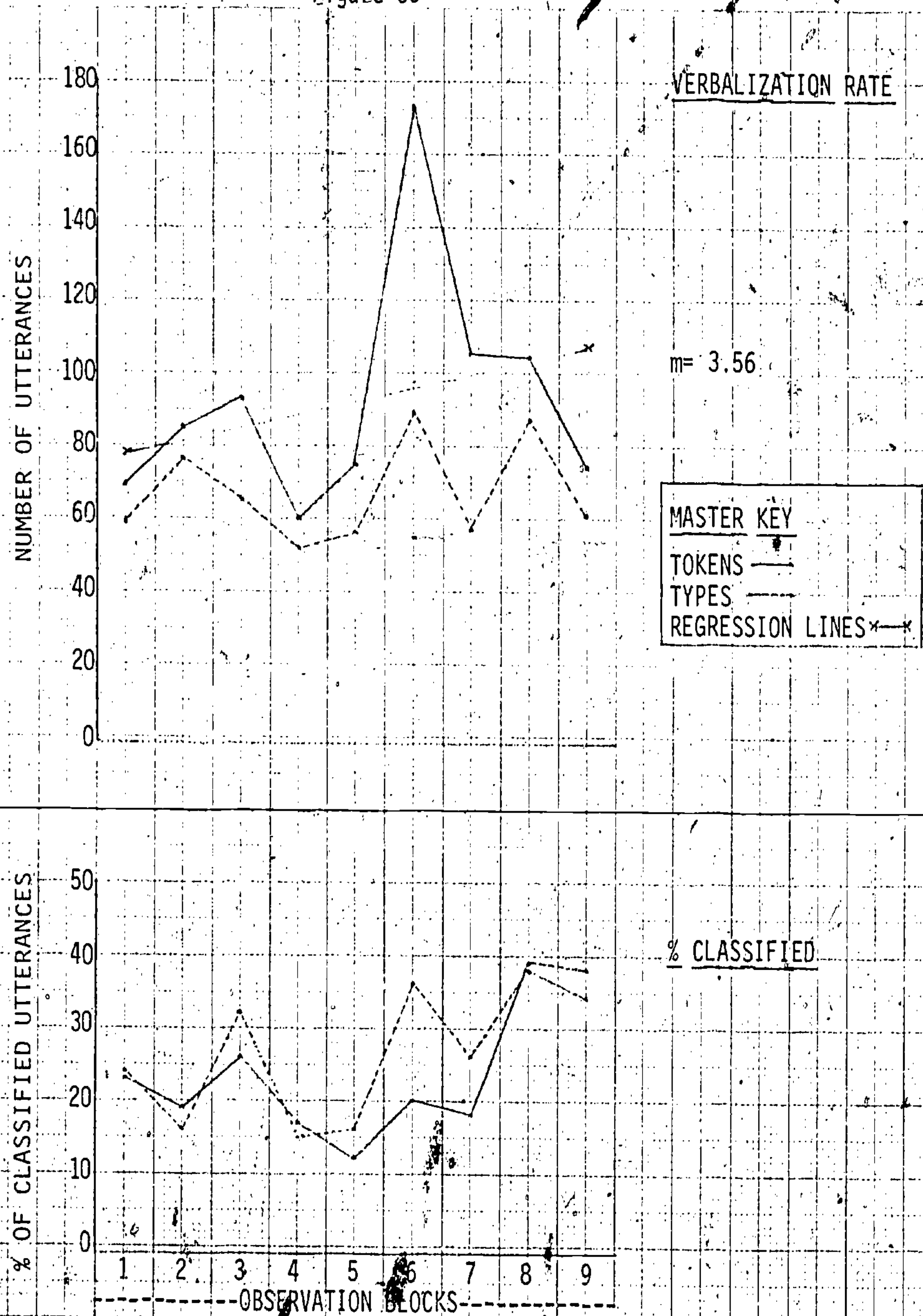


Figure 66

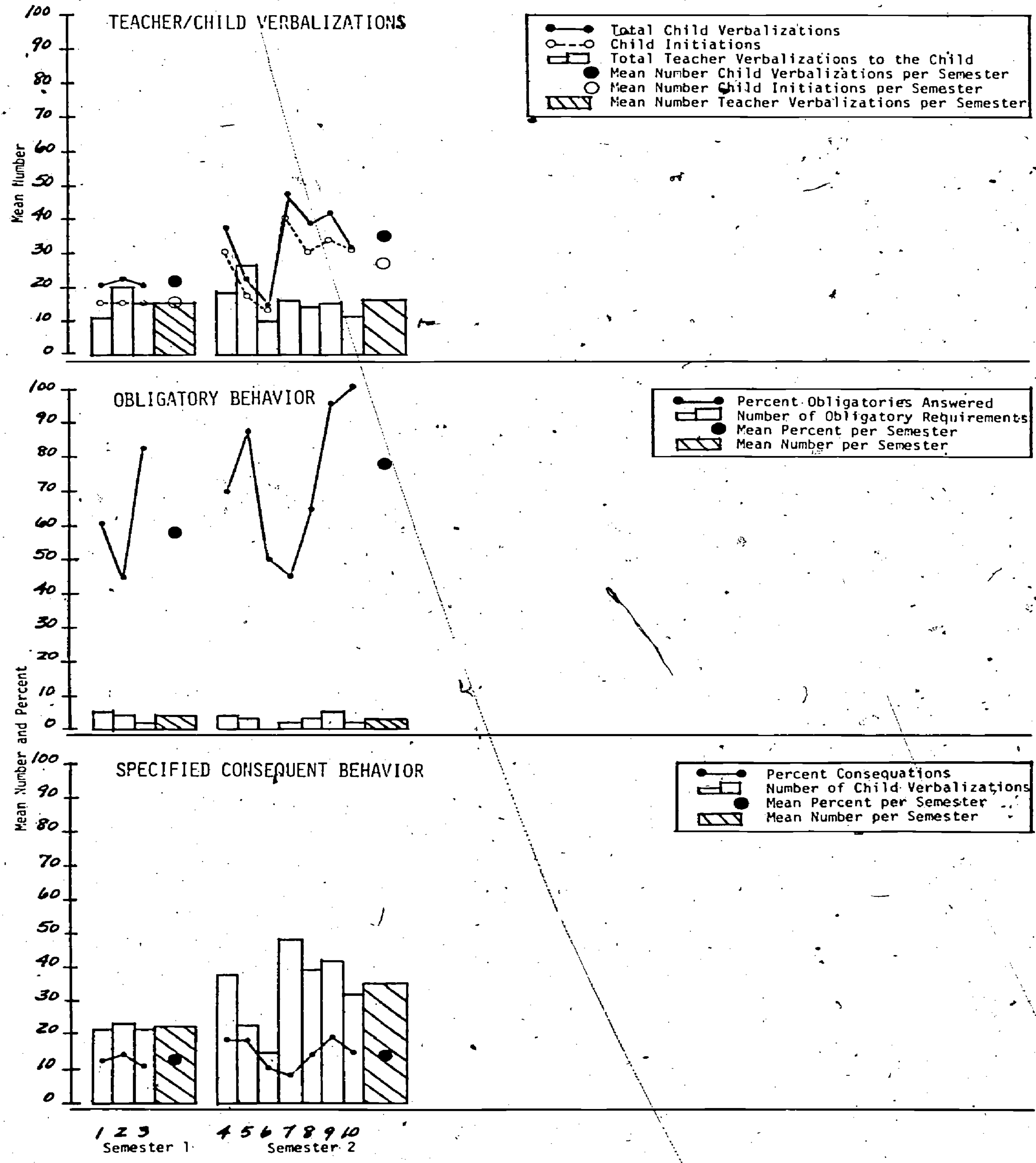
SUBJECT: CZ
SITE: lawr



## Figure 67
# VERBAL INTERACTION ANALYSIS

SUBJECT: CZ

SITE: LAWRENCE




Sessions (by five day blocks)

Subject: W.A.

Site: Lawrence

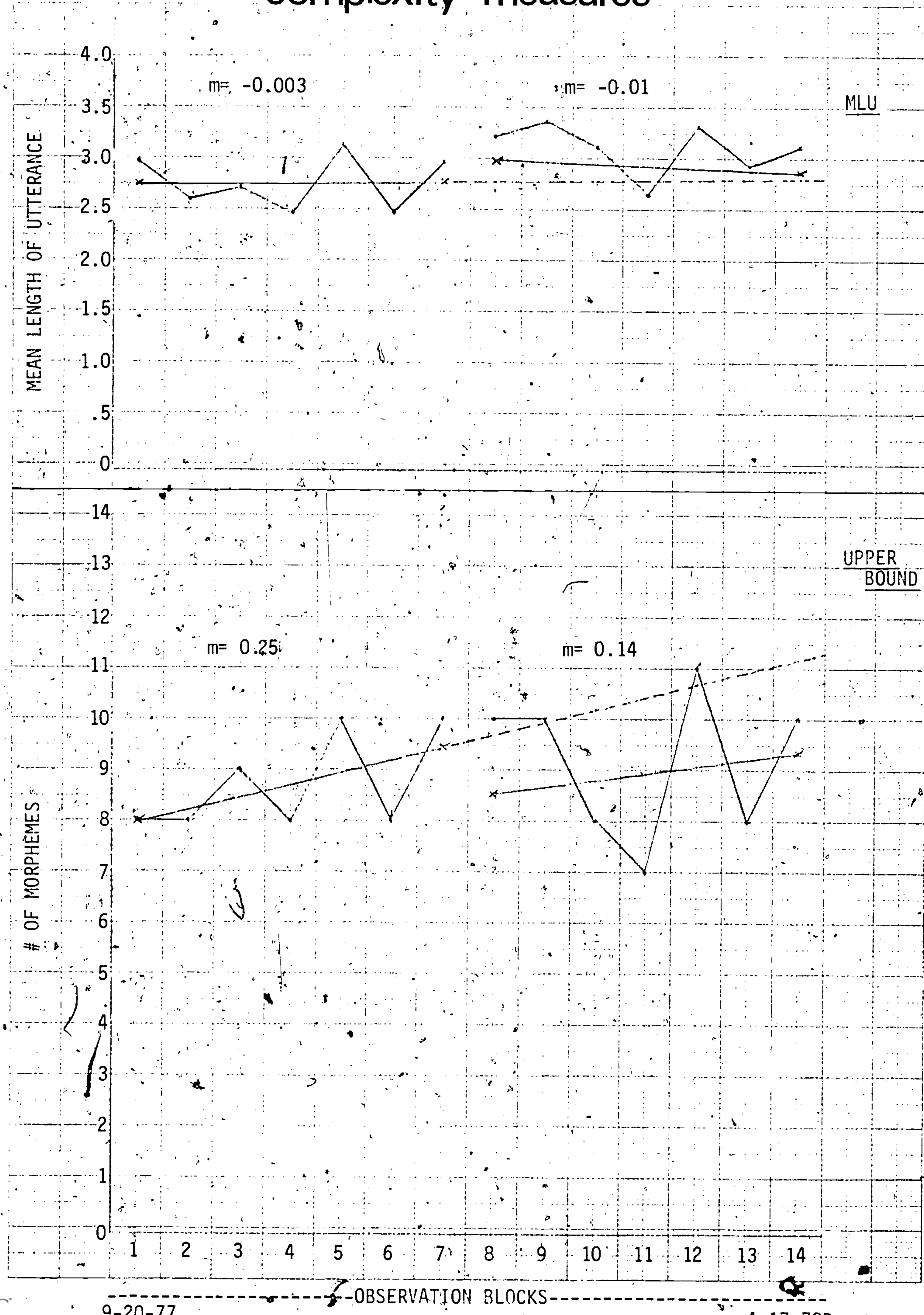
Figures 68 through 72

SUBJECT: WA

Figure 68

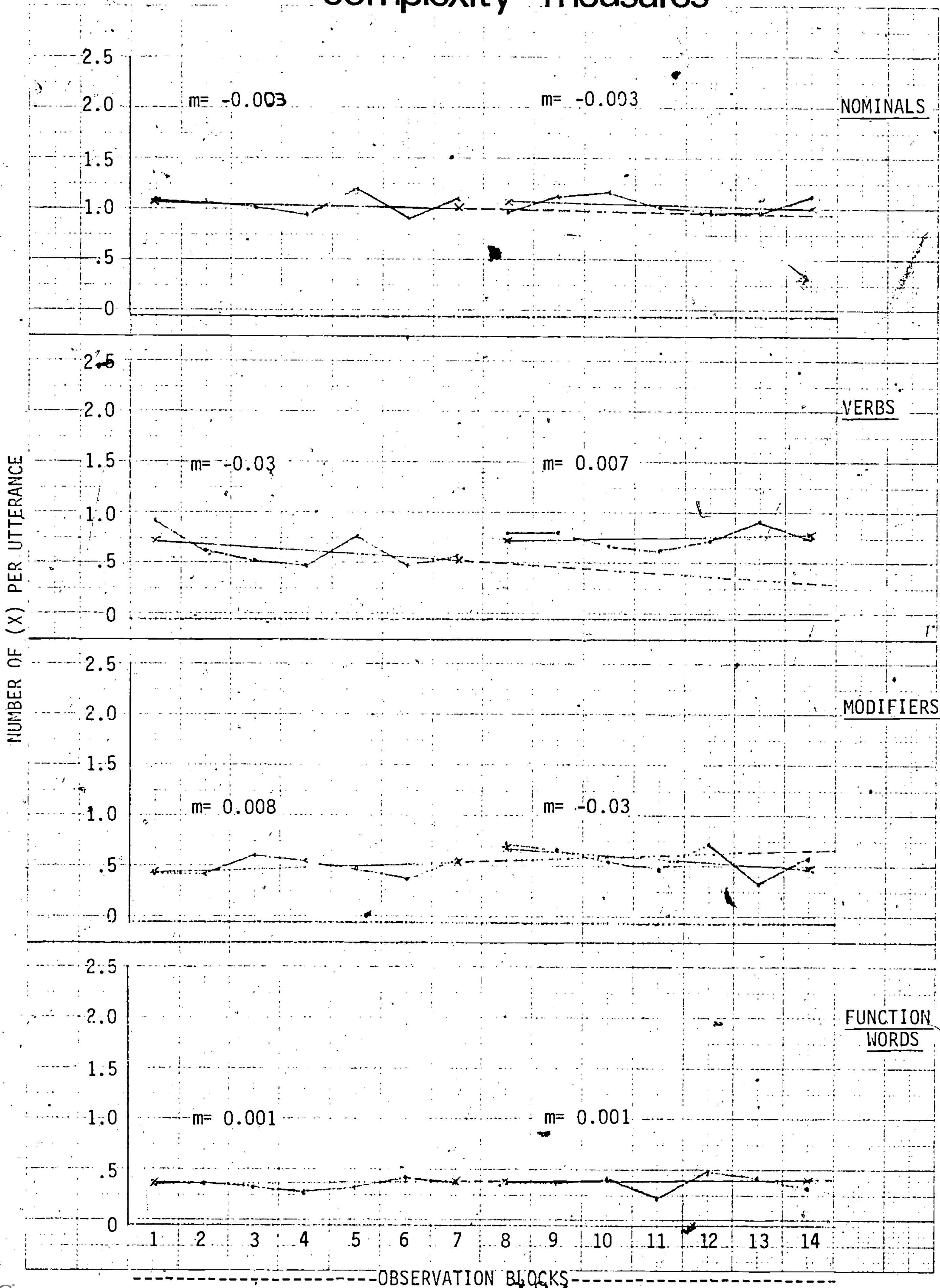
SITE: LAWR

# complexity measures



SUBJECT: WA Figure 69 SITE: LAWR

# complexity measures



Subject: WA

Figure 70

Site: Lawr

## major categories

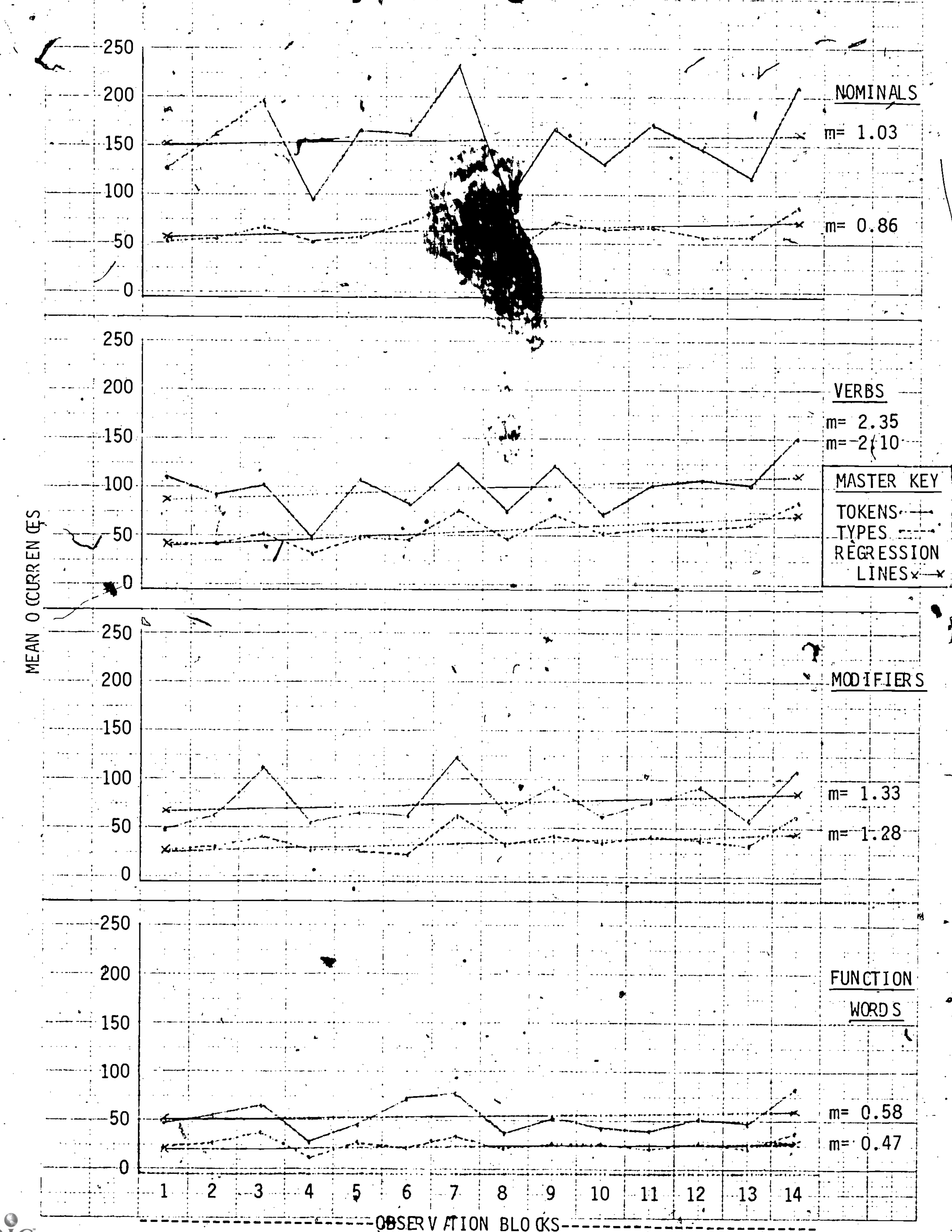


Figure 71

SUBJECT: WA

SITE: LAWR

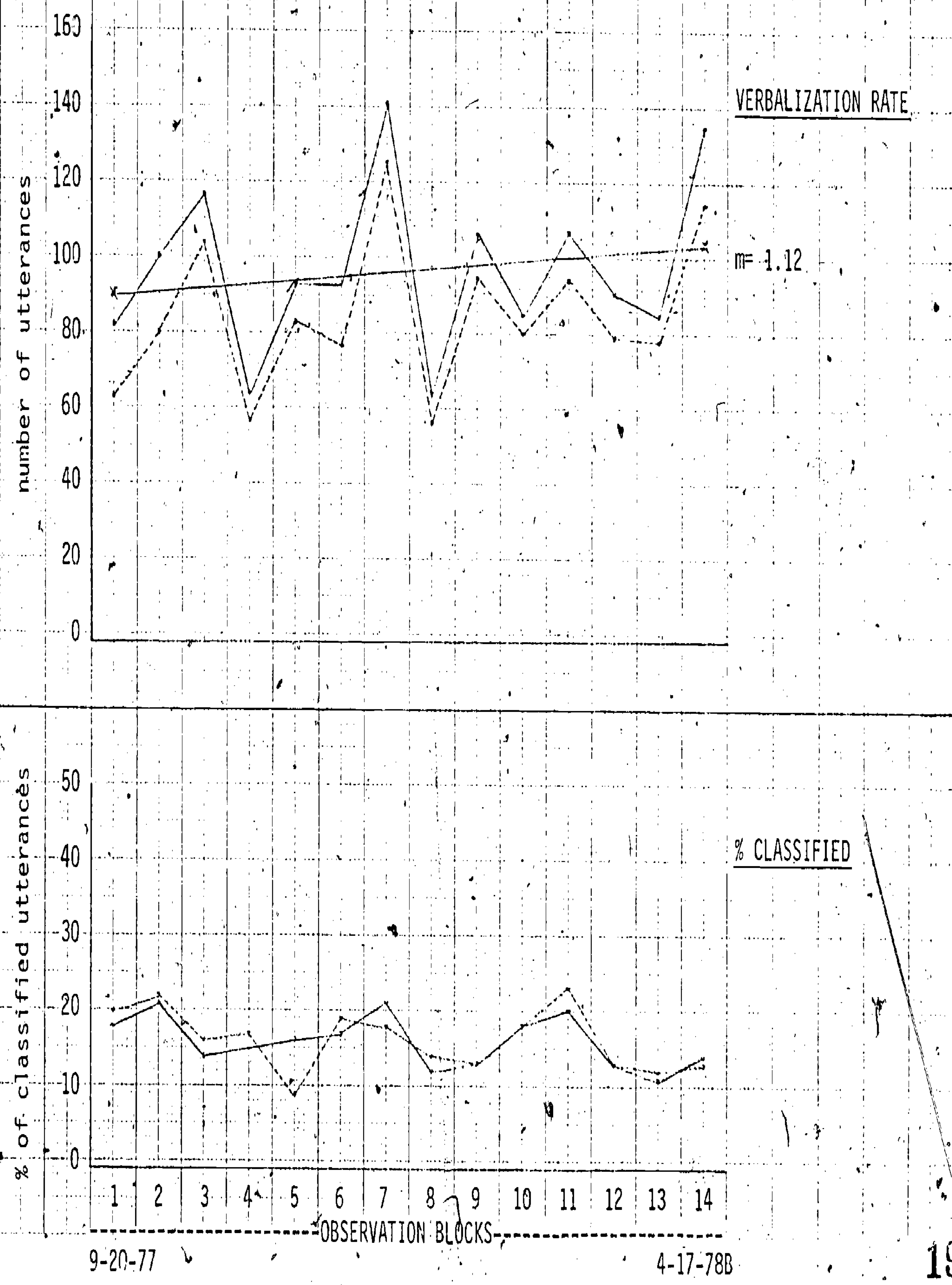
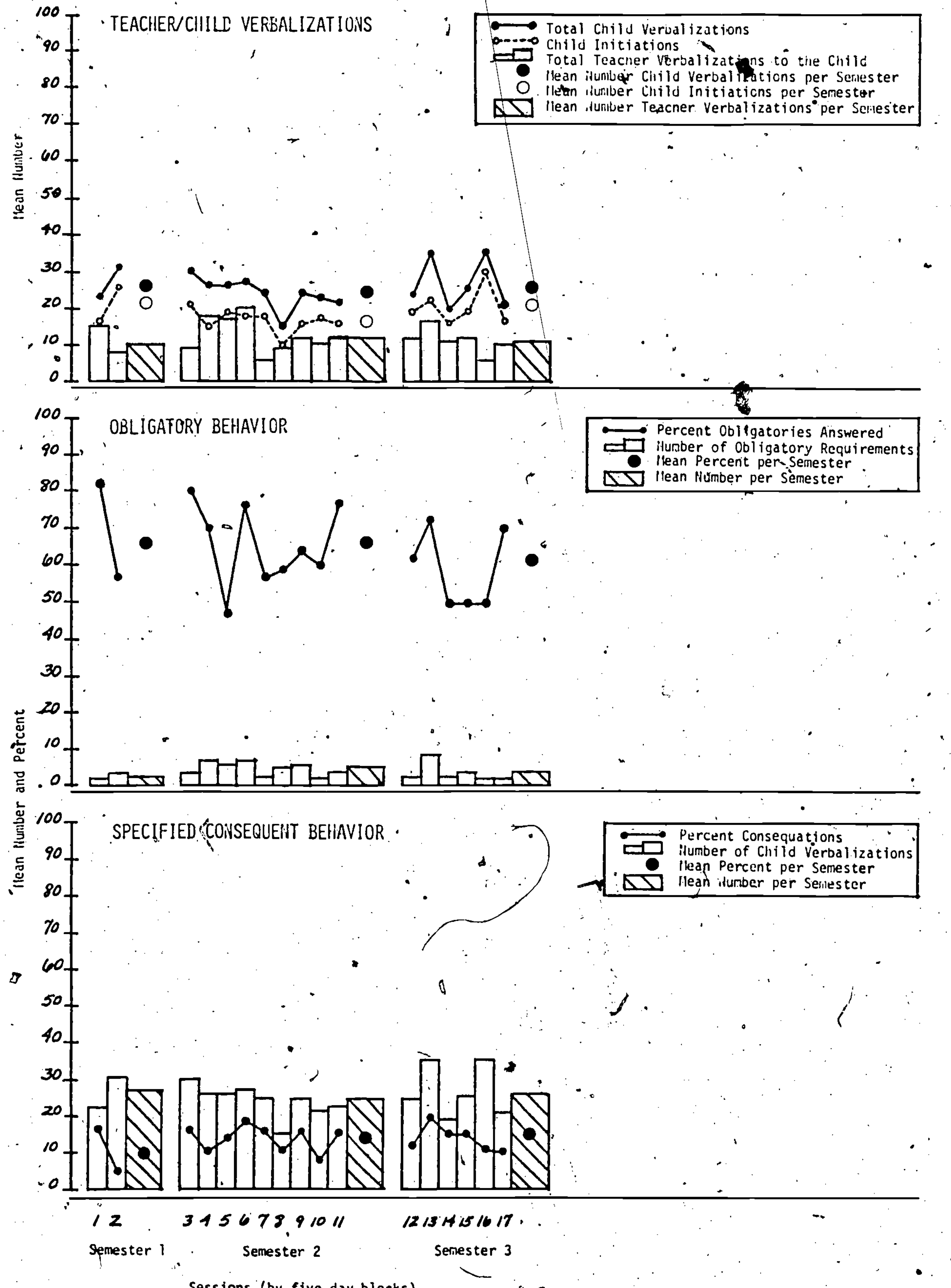


Figure 72

VERBAL INTERACTION ANALYSIS

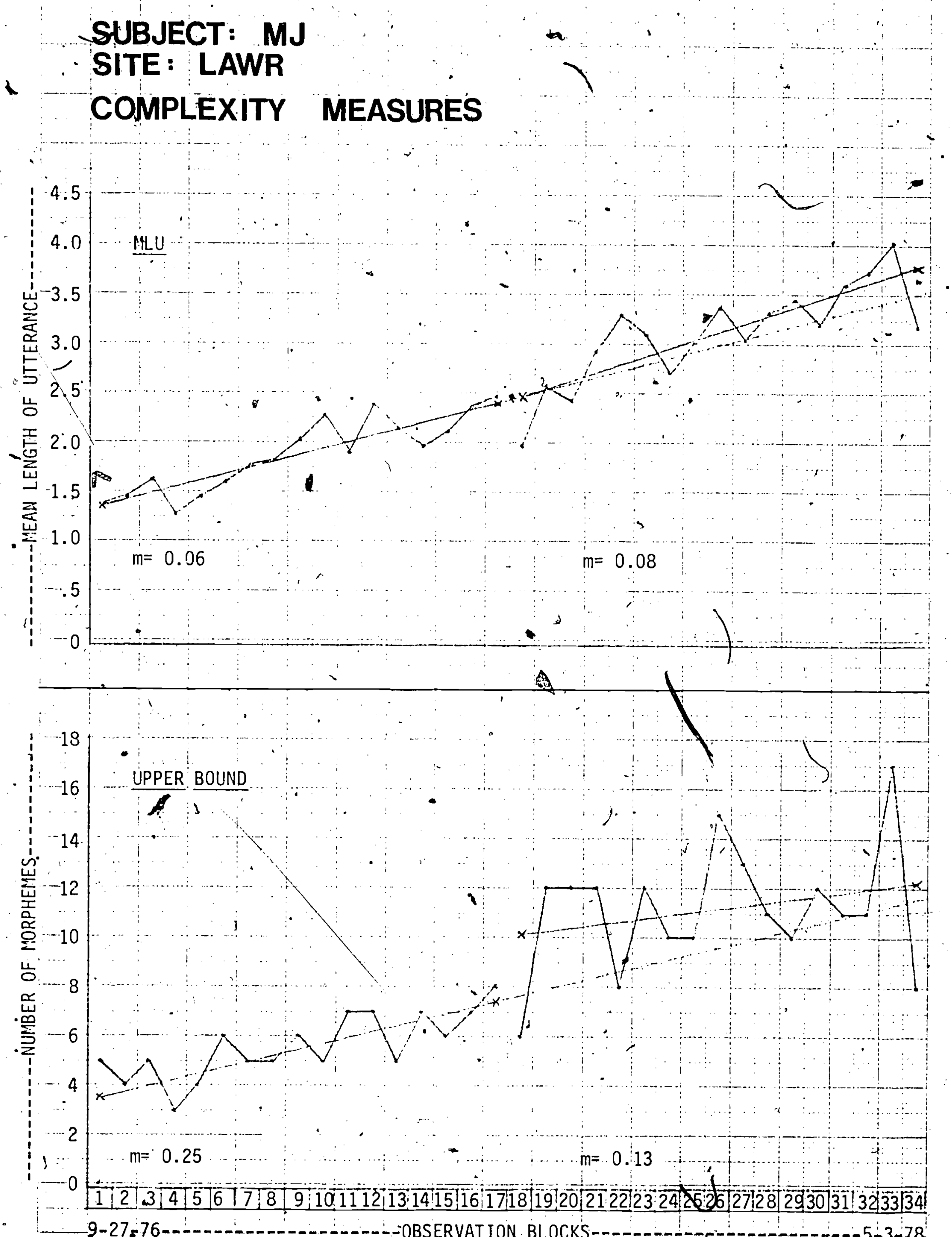
SUBJECT: WA SITE: LAWRENCE



Subject: M.J.

Site: Lawrence

Figures 73 through 77

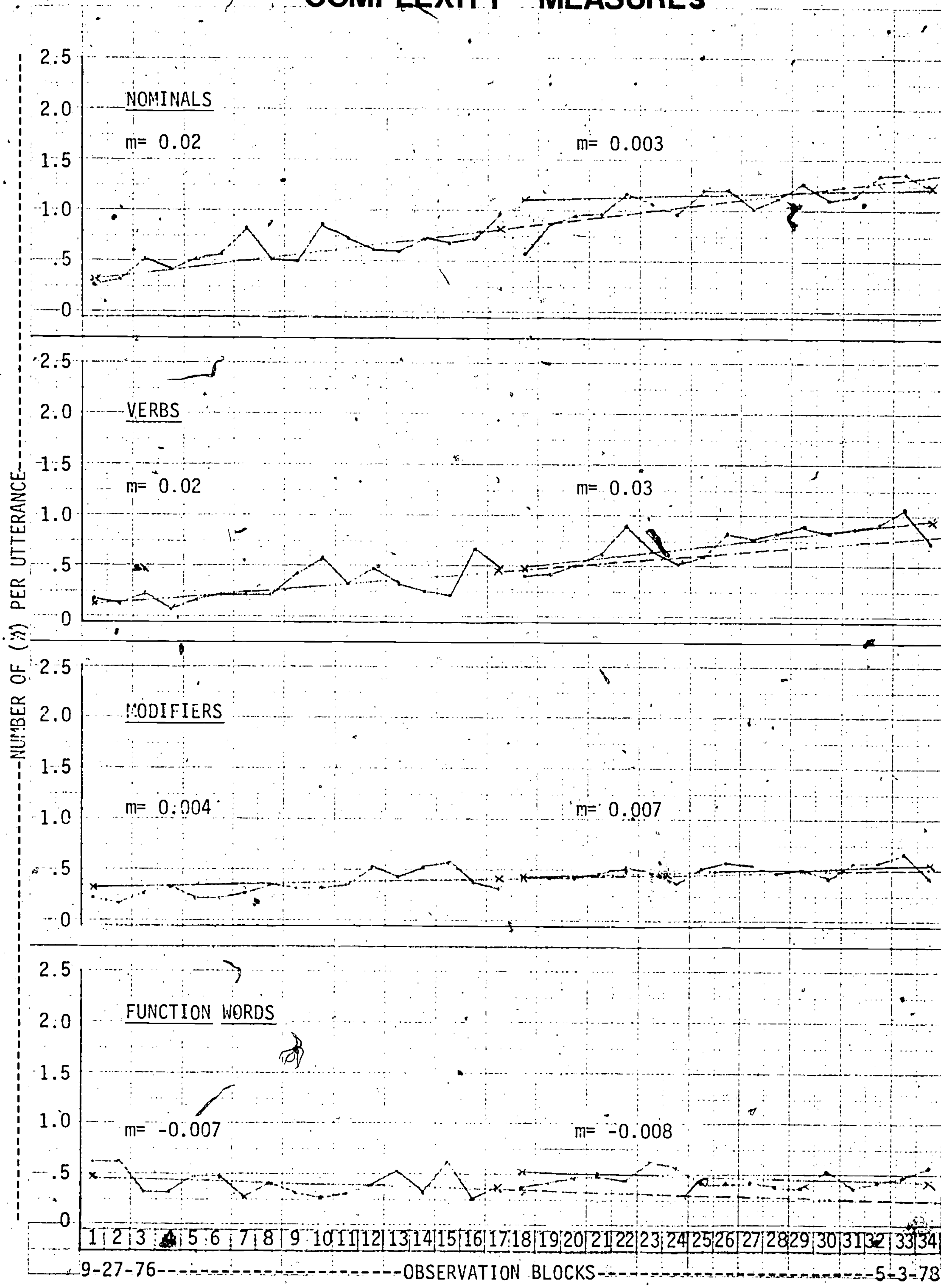

SUBJECT: MJ
SITE: LAWR
COMPLEXITY MEASURES
MEAN LENGTH OF UTTERANCE
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
0
MLU
m= 0.06
m= 0.08
NUMBER OF MORPHEMES
18
16
14
12
10
8
6
4
2
0
UPPER BOUND
m= 0.25
m= 0.13
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
9-27-76
OBSERVATION BLOCKS
5-3-78

SUBJECT: MJ

Figure 74

SITE: LAWR

# COMPLEXITY MEASURES

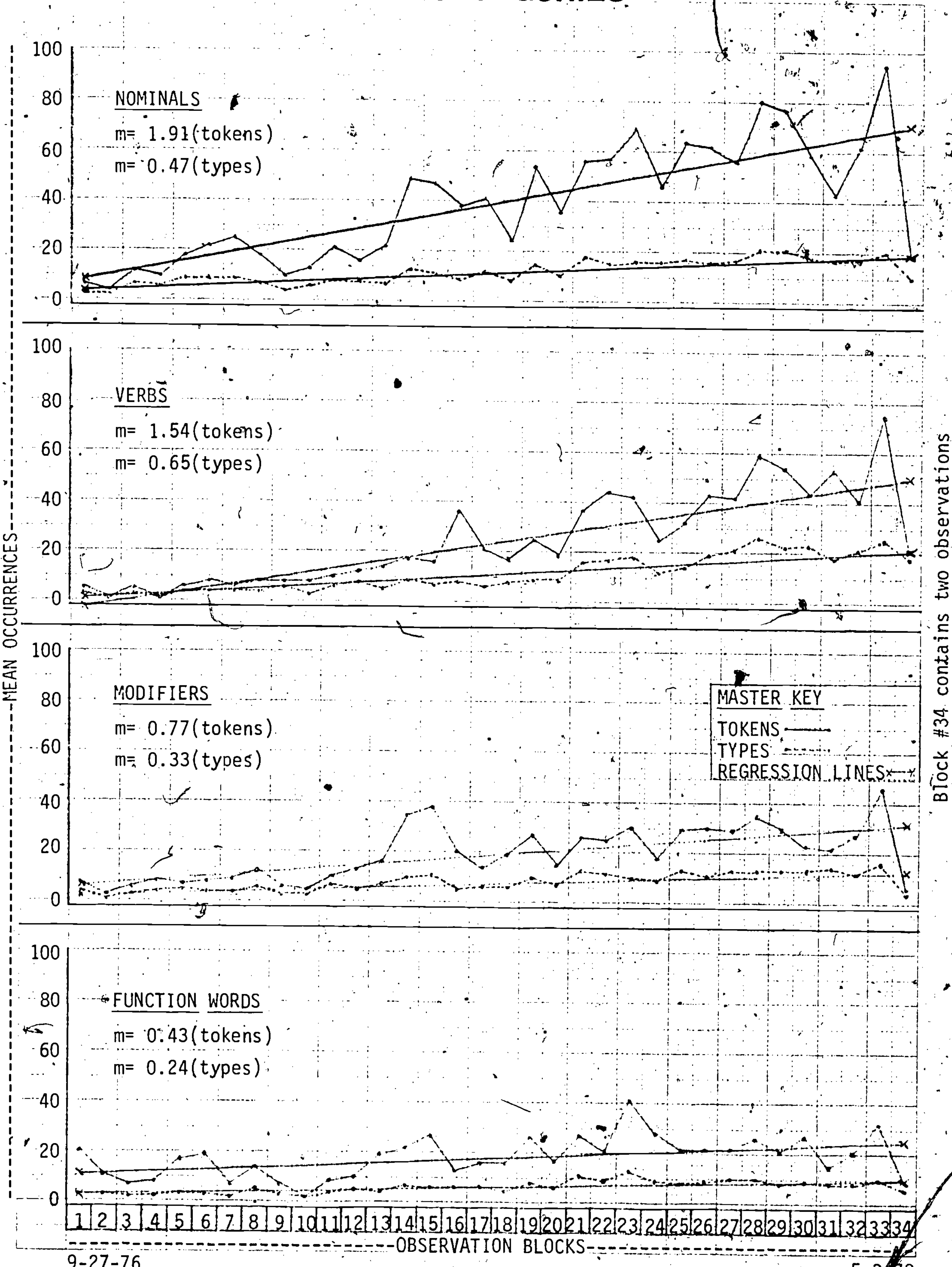


SUBJECT: MJ

SITE: LAWR

Figure 75

# MAJOR CATEGORIES



SUBJECT: MJ SITE: LAWR

Figure 76

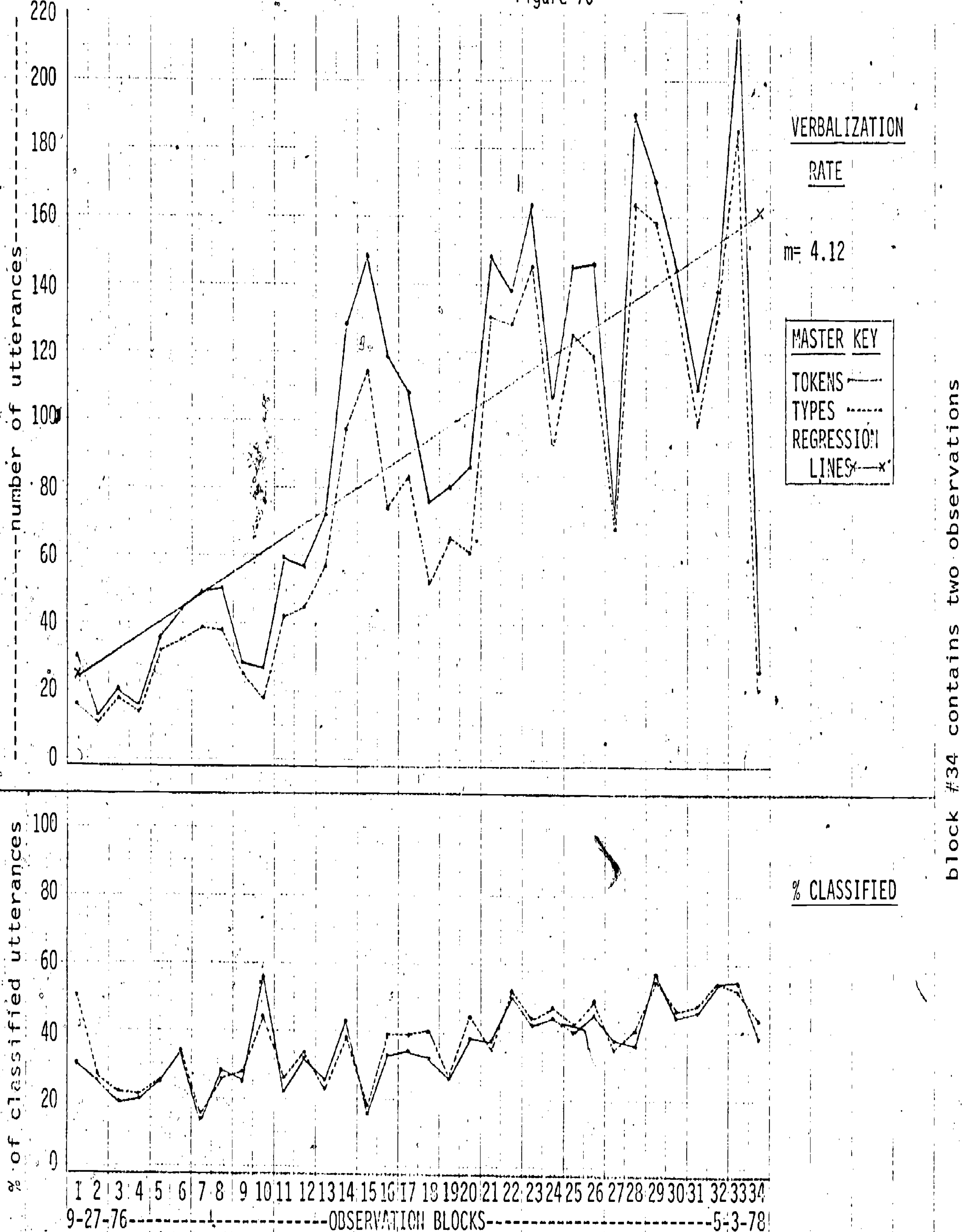
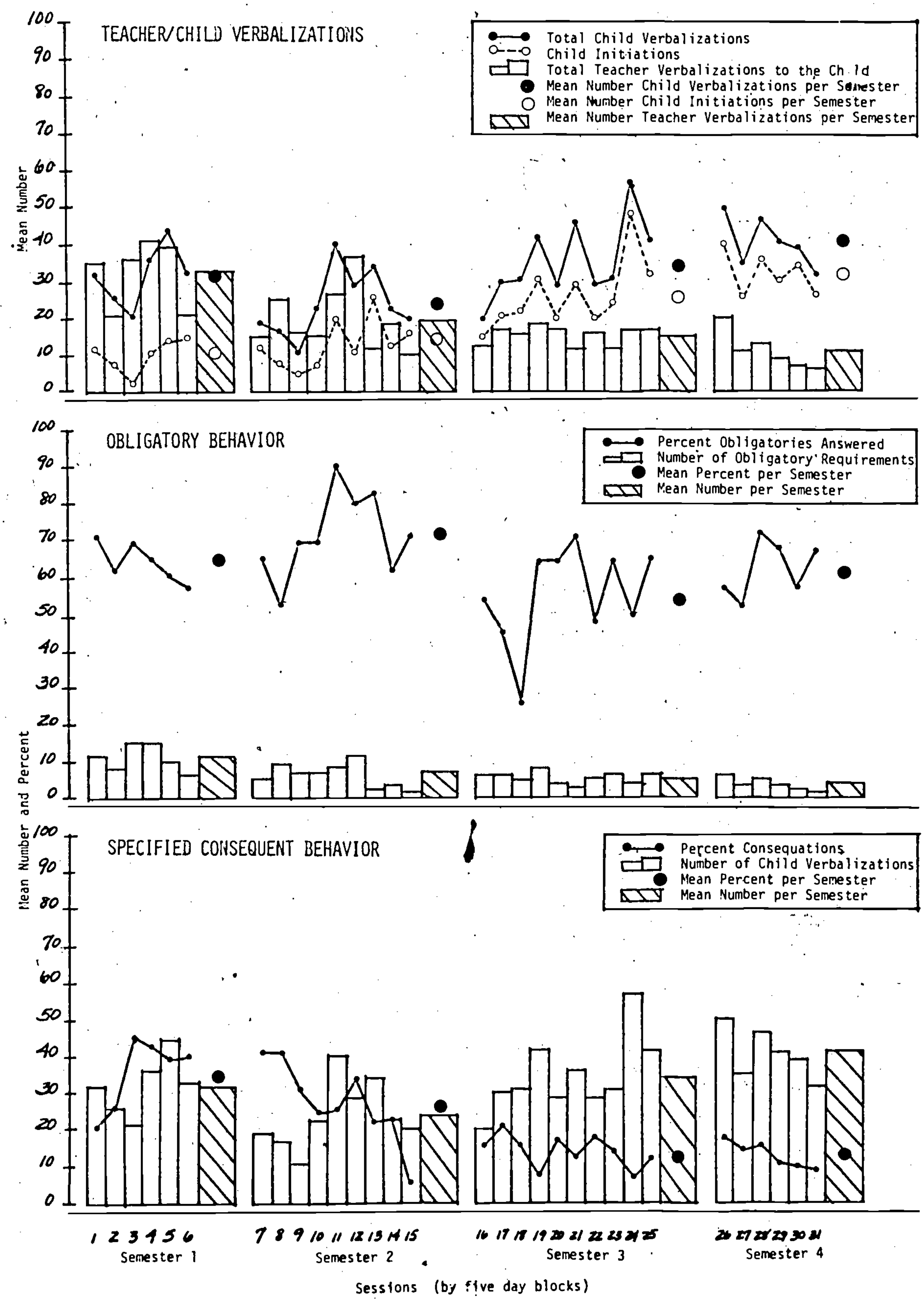


Figure 77

# VERBAL INTERACTION ANALYSIS

SUBJECT: MJ SITE: LAWRENCE



Subject: D.N.

Site: Lawrence L

Figures 78 through 82

SUBJECT: DN

SITE: LAWR.

# COMPLEXITY MEASURES

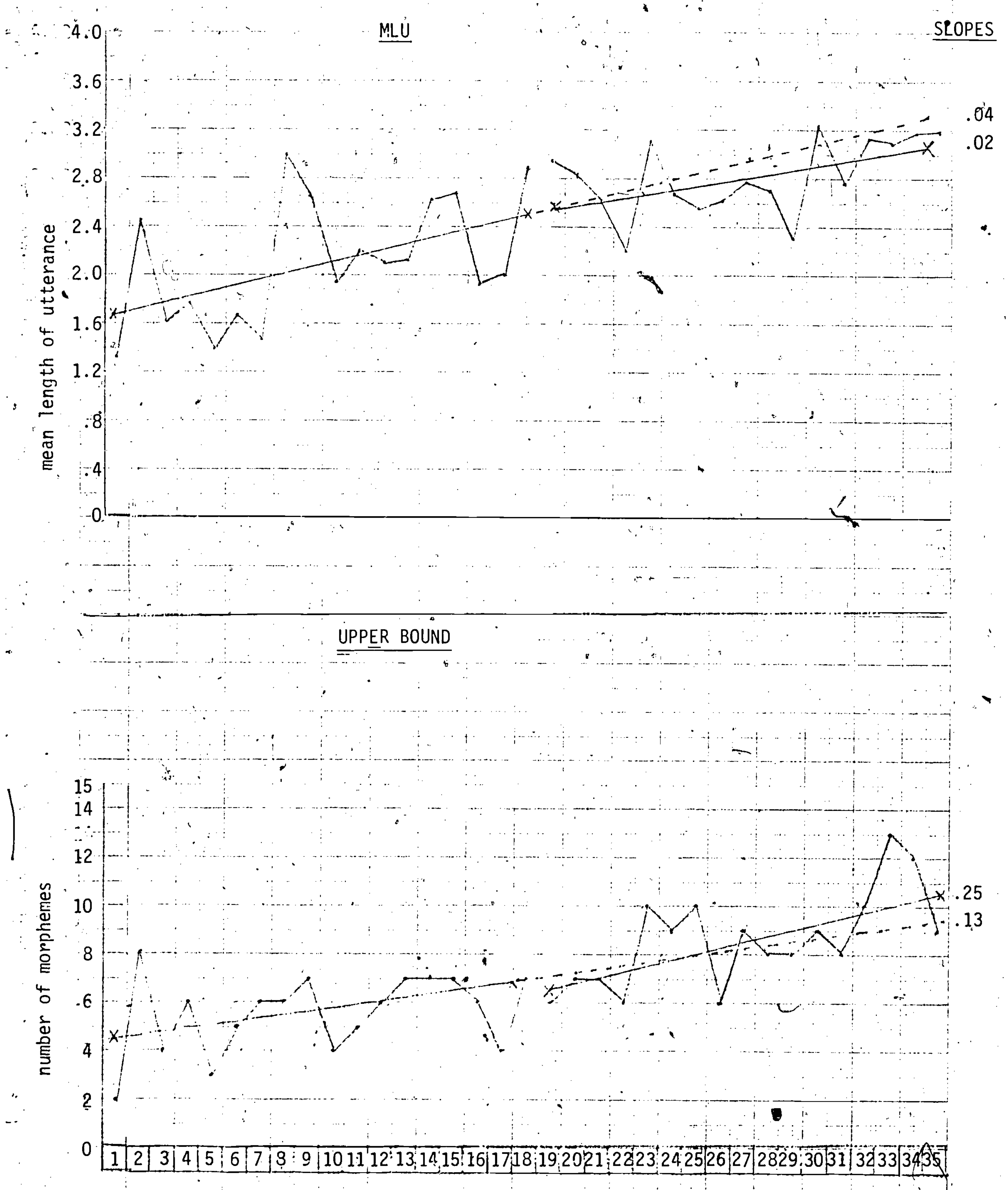


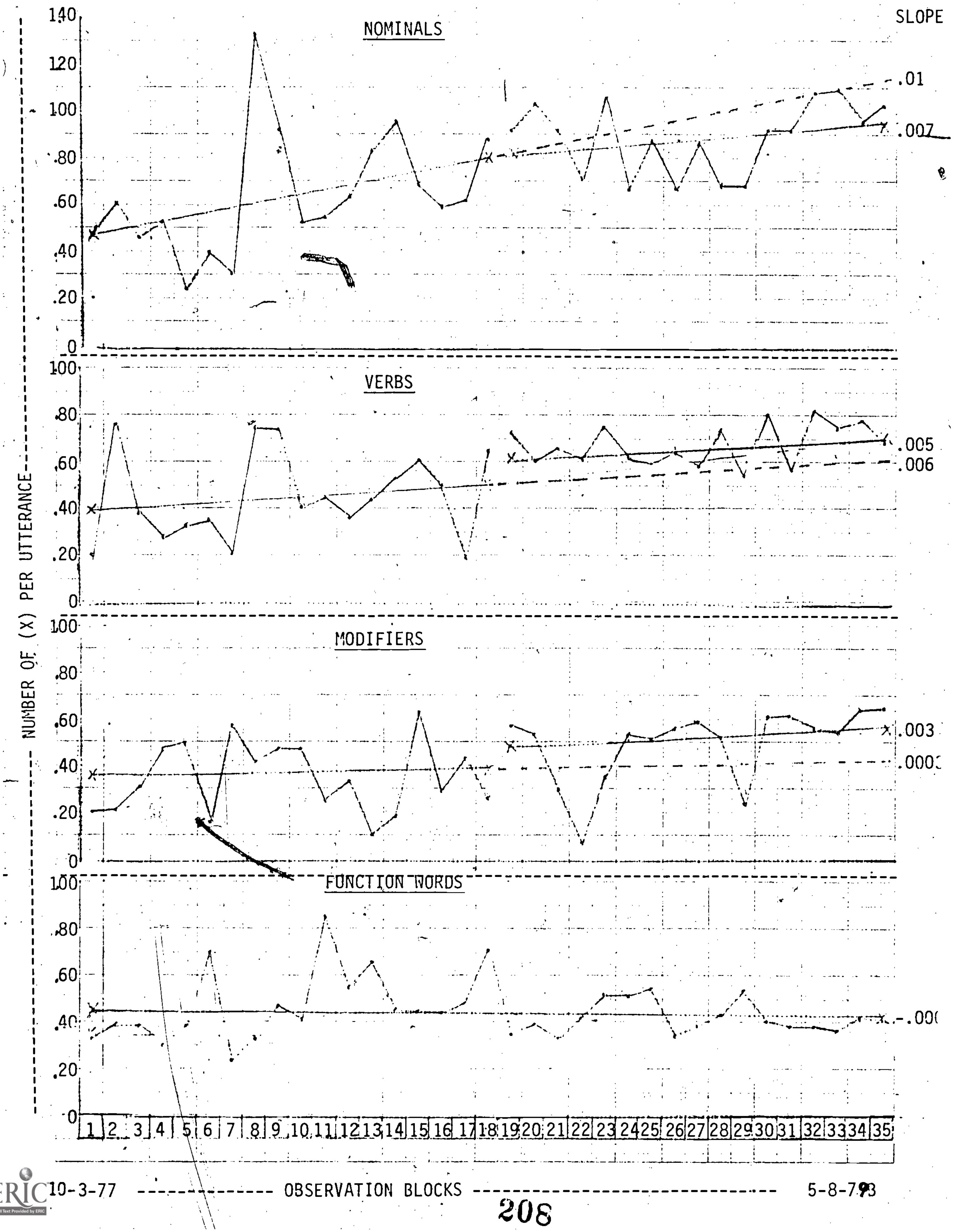

Figure 78

SUBJECT: DN

SITE: LAWR.

Figure 79

# COMPLEXITY MEASURES



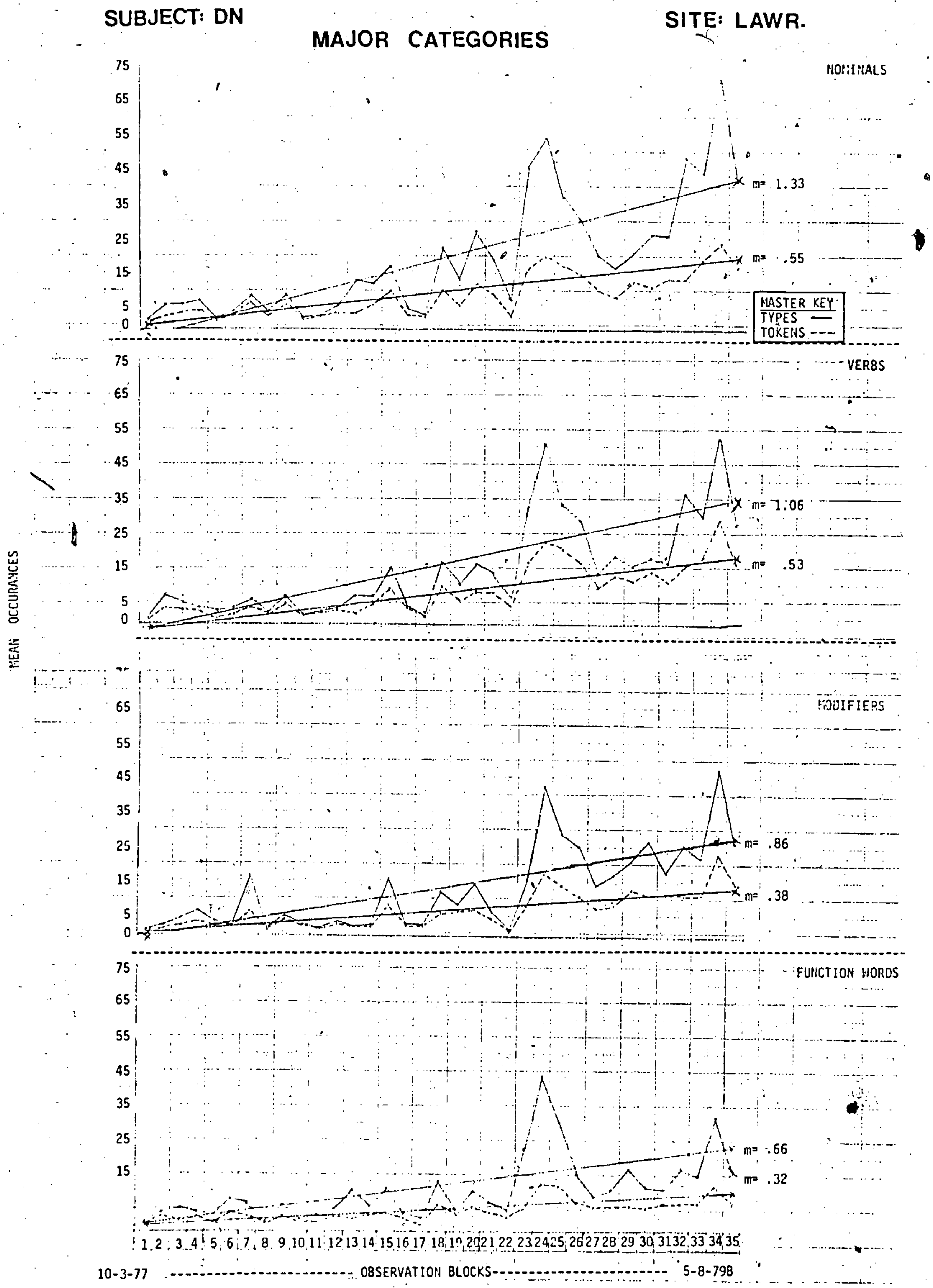
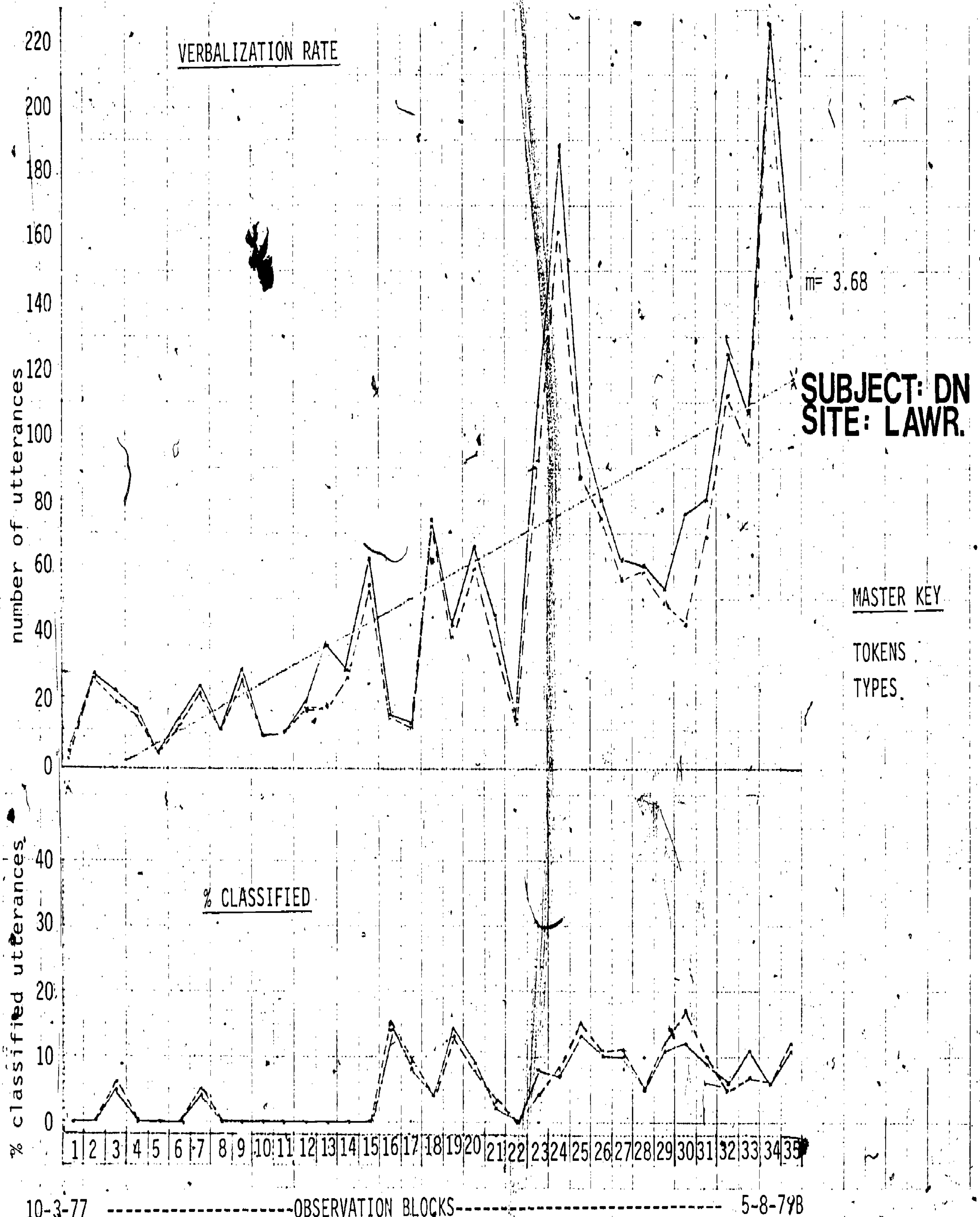

SUBJECT: DN
SITE: LAWR.
MAJOR CATEGORIES
NOMINALS
m= 1.33
m= .55
MASTER KEY
TYPES
TOKENS
VERBS
m= 1.06
m= .53
MODIFIERS
m= .86
m= .38
FUNCTION WORDS
m= .66
m= .32
MEAN OCCURANCES
10-3-77
OBSERVATION BLOCKS
5-8-798

Figure 80



VERBALIZATION RATE
number of utterances
220
200
180
160
140
120
100
80
60
40
20
0
m= 3.68
SUBJECT: DN
SITE: LAWR.
MASTER KEY
TOKENS
TYPES
% CLASSIFIED
% classified utterances
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
10-3-77 OBSERVATION BLOCKS 5-8-79B


Figure 81

# VERBAL INTERACTION ANALYSIS

SUBJECT: DH

SITE: LAWRENCE

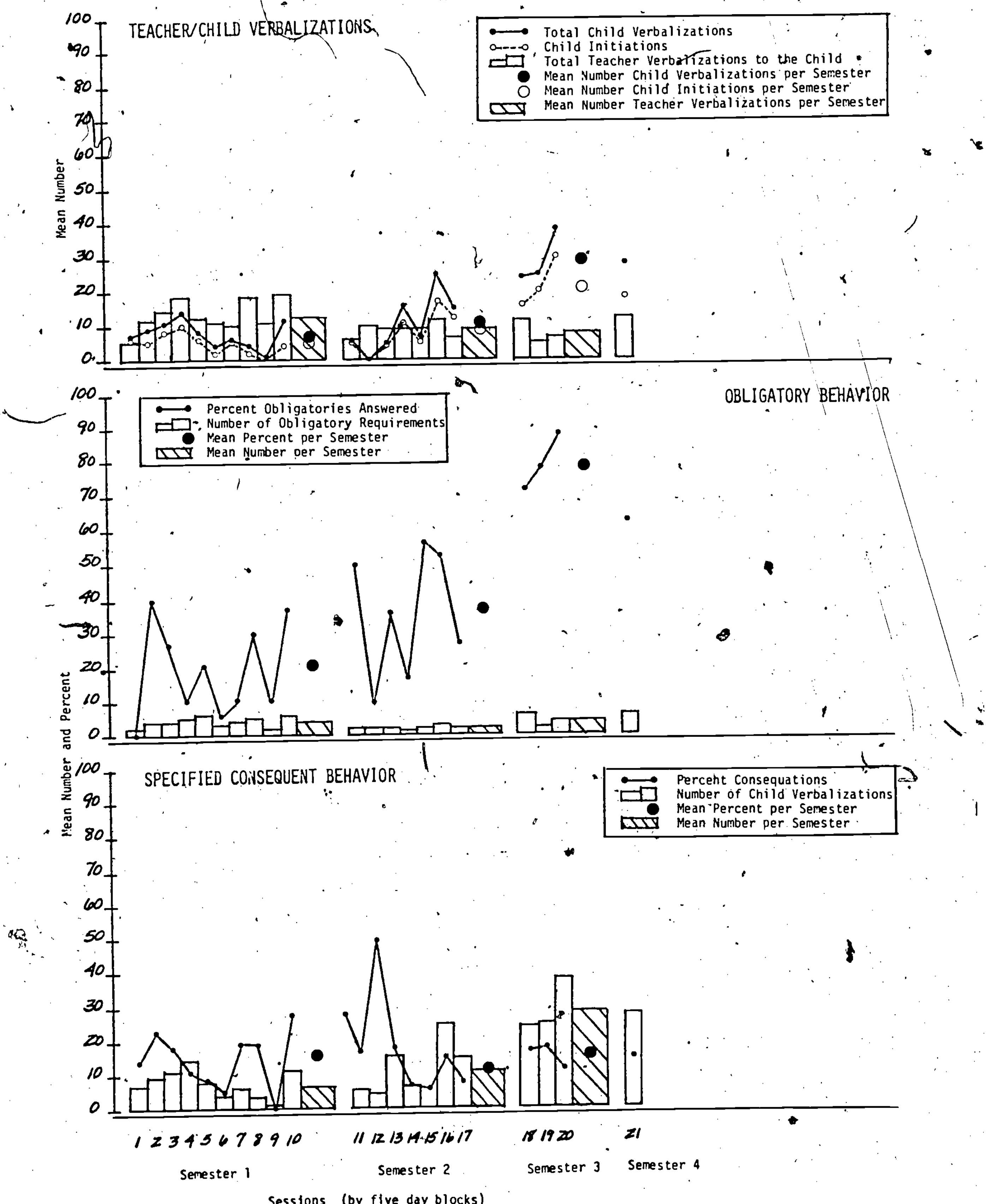



Figure 82

Subject: J.I.

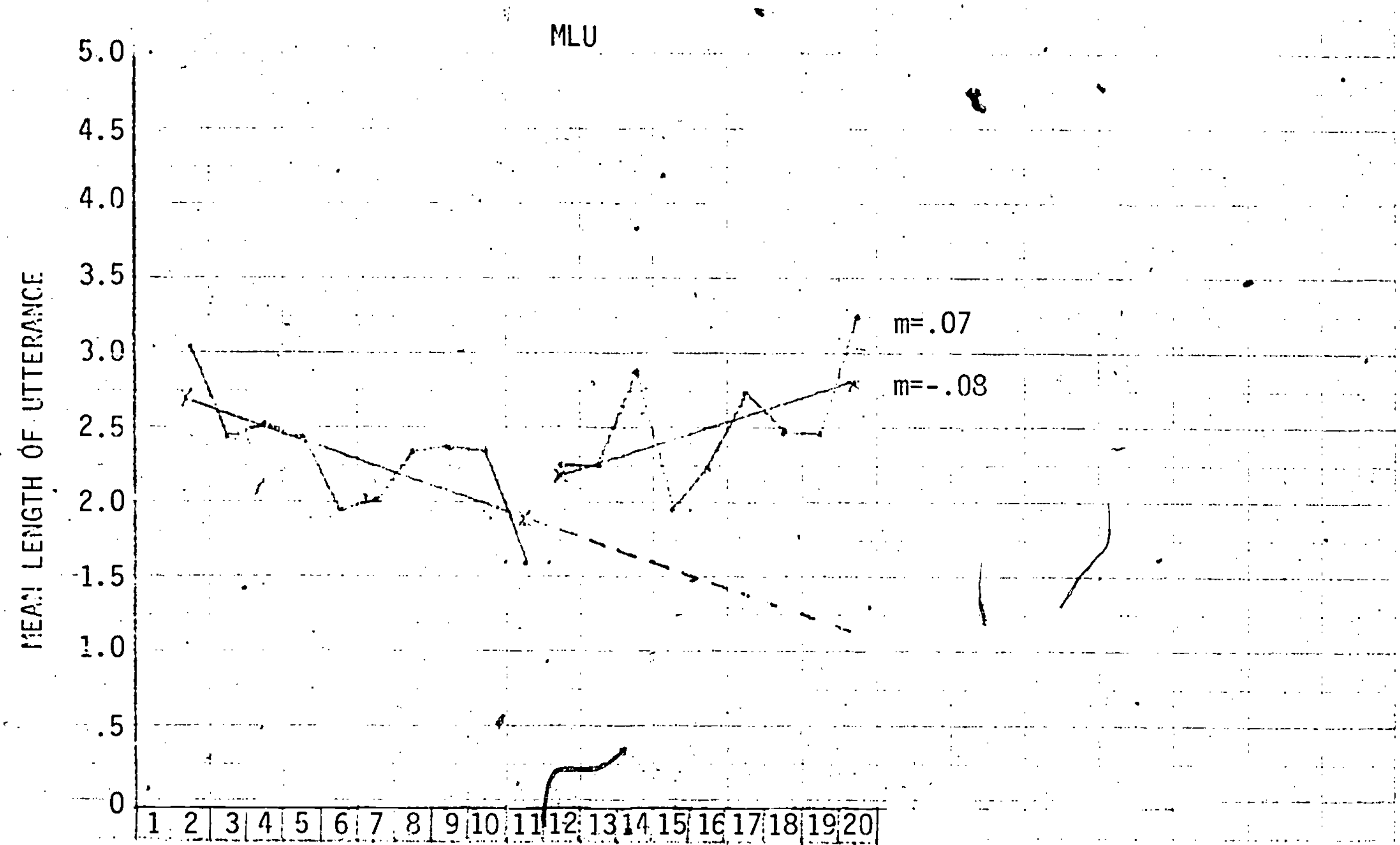
Site: Lawrence

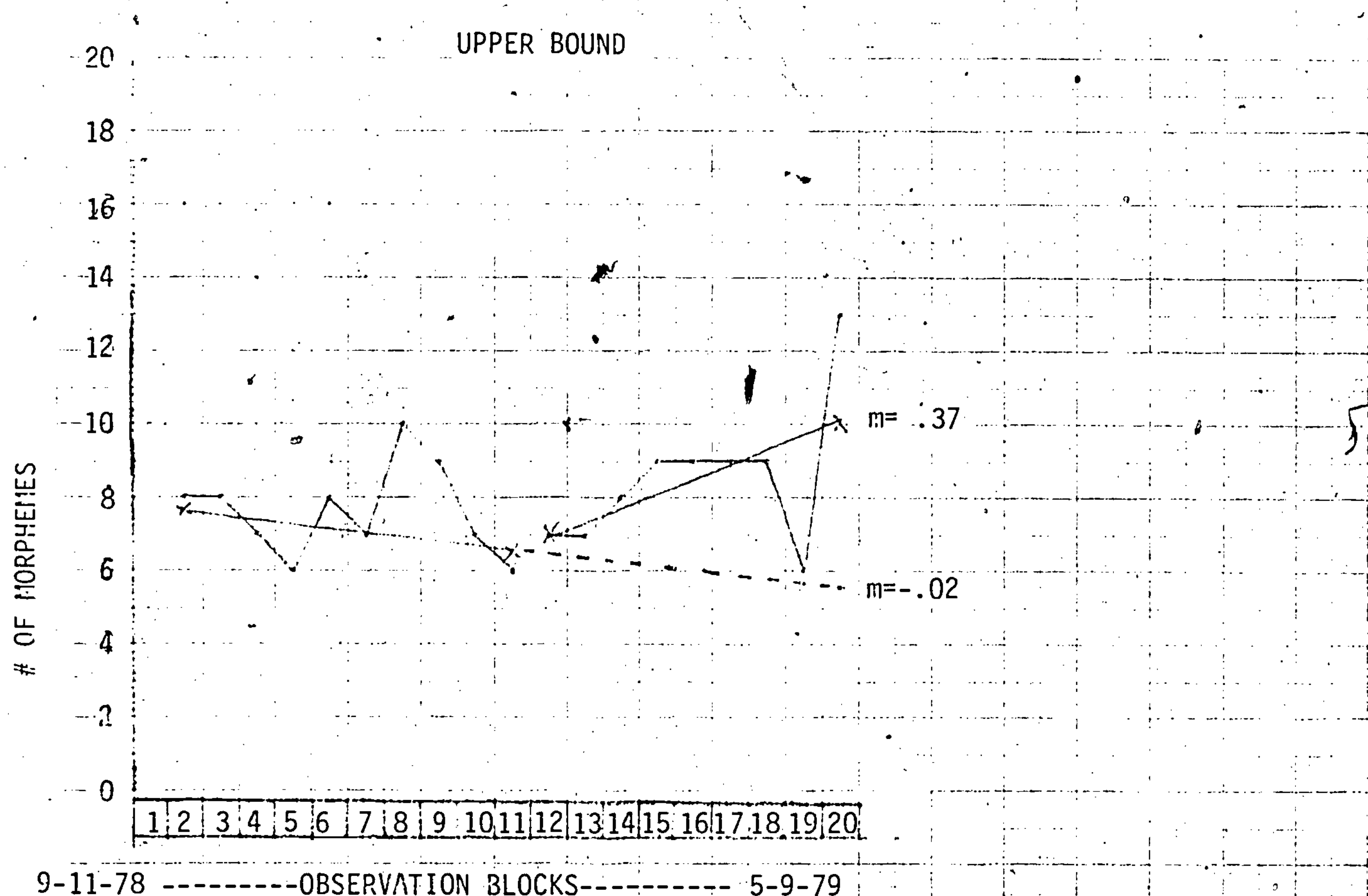
Figures 83 through 87

SUBJECT: J SITE: LAWR.

Figure 83

# COMPLEXITY MEASURES

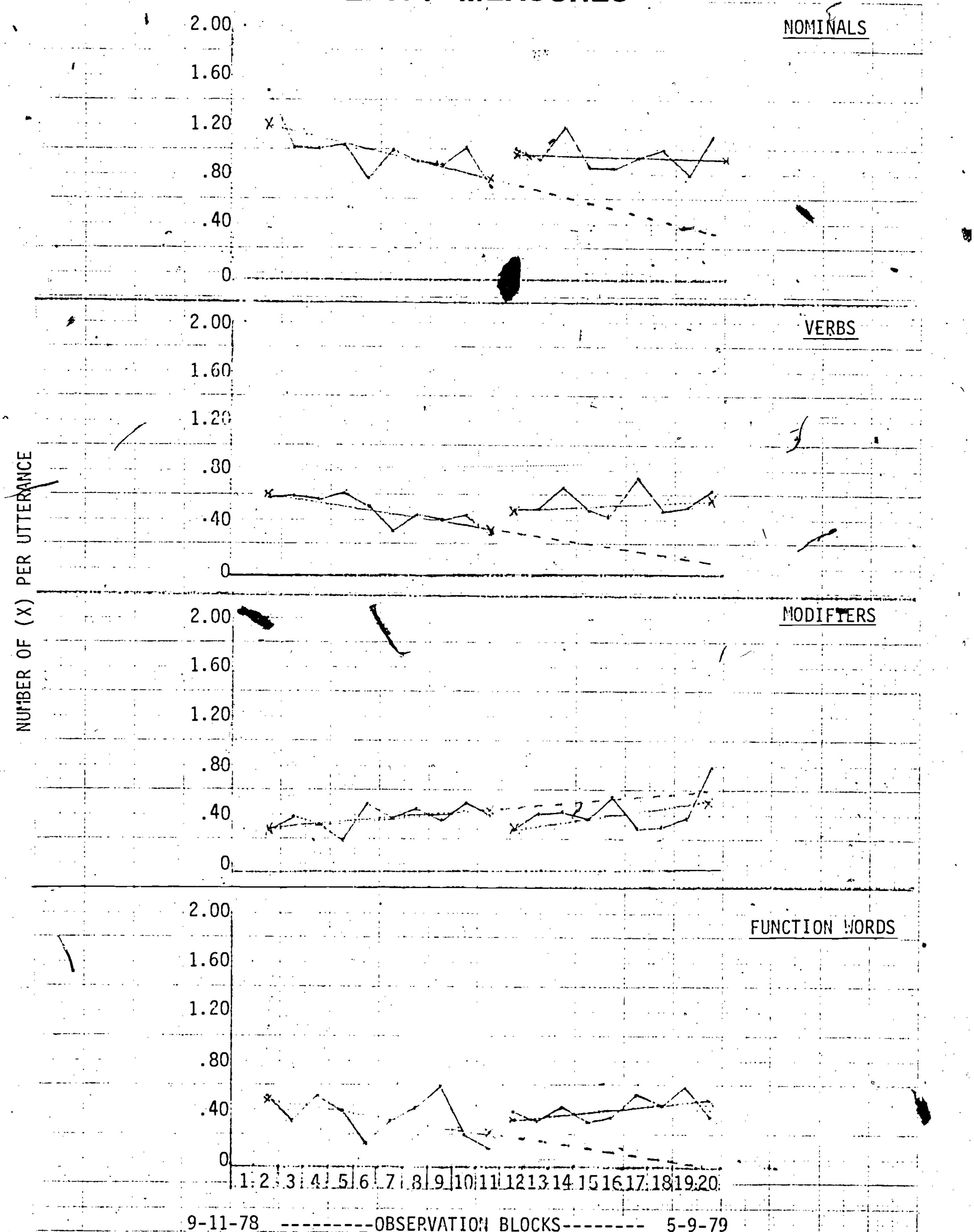


SUBJECT: JI SITE: LAWR.

Figure 84

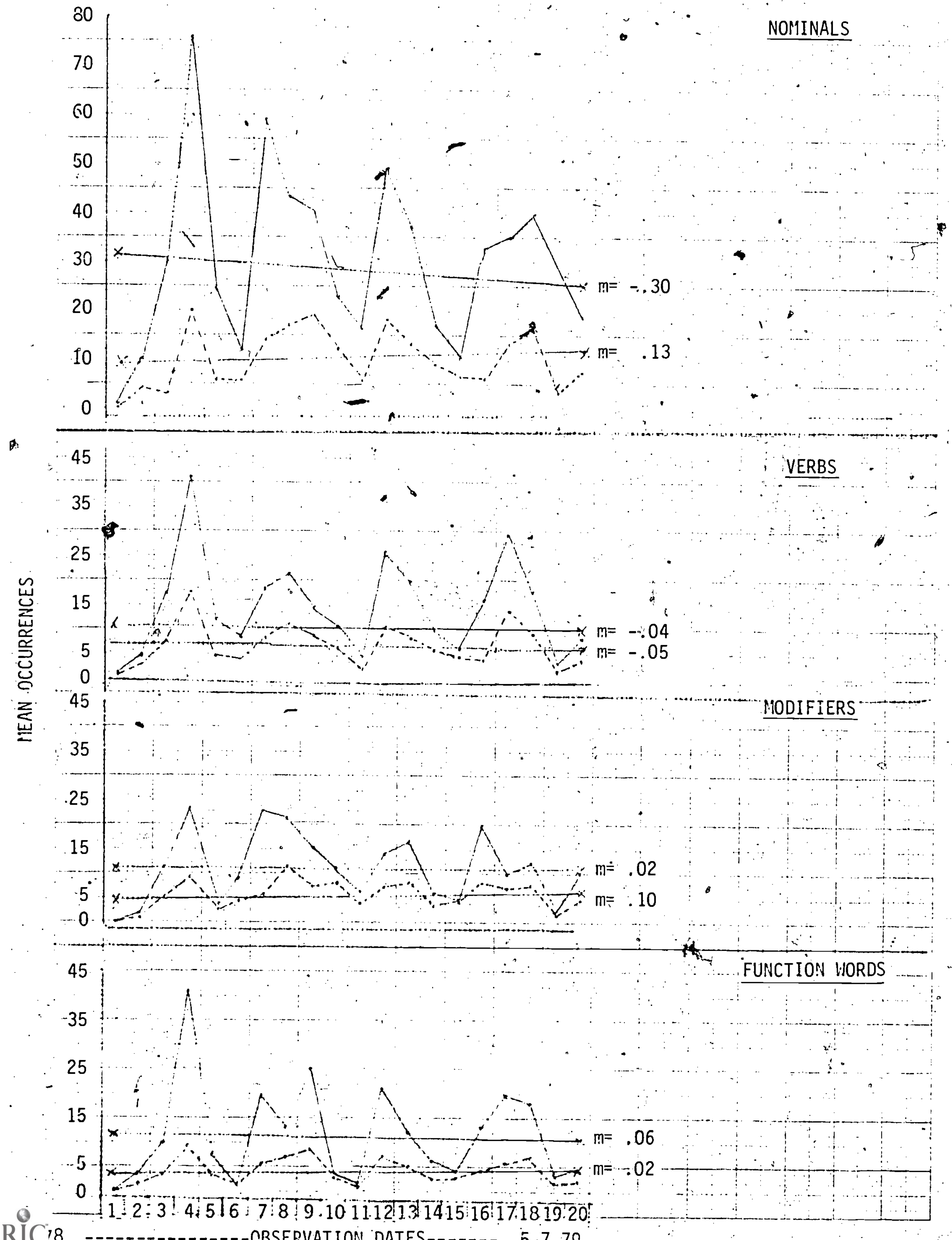
# COMPLEXITY MEASURES



SUBJECT: JI SITE: LAWR.

Figure 85

# MAJOR CATEGORIES



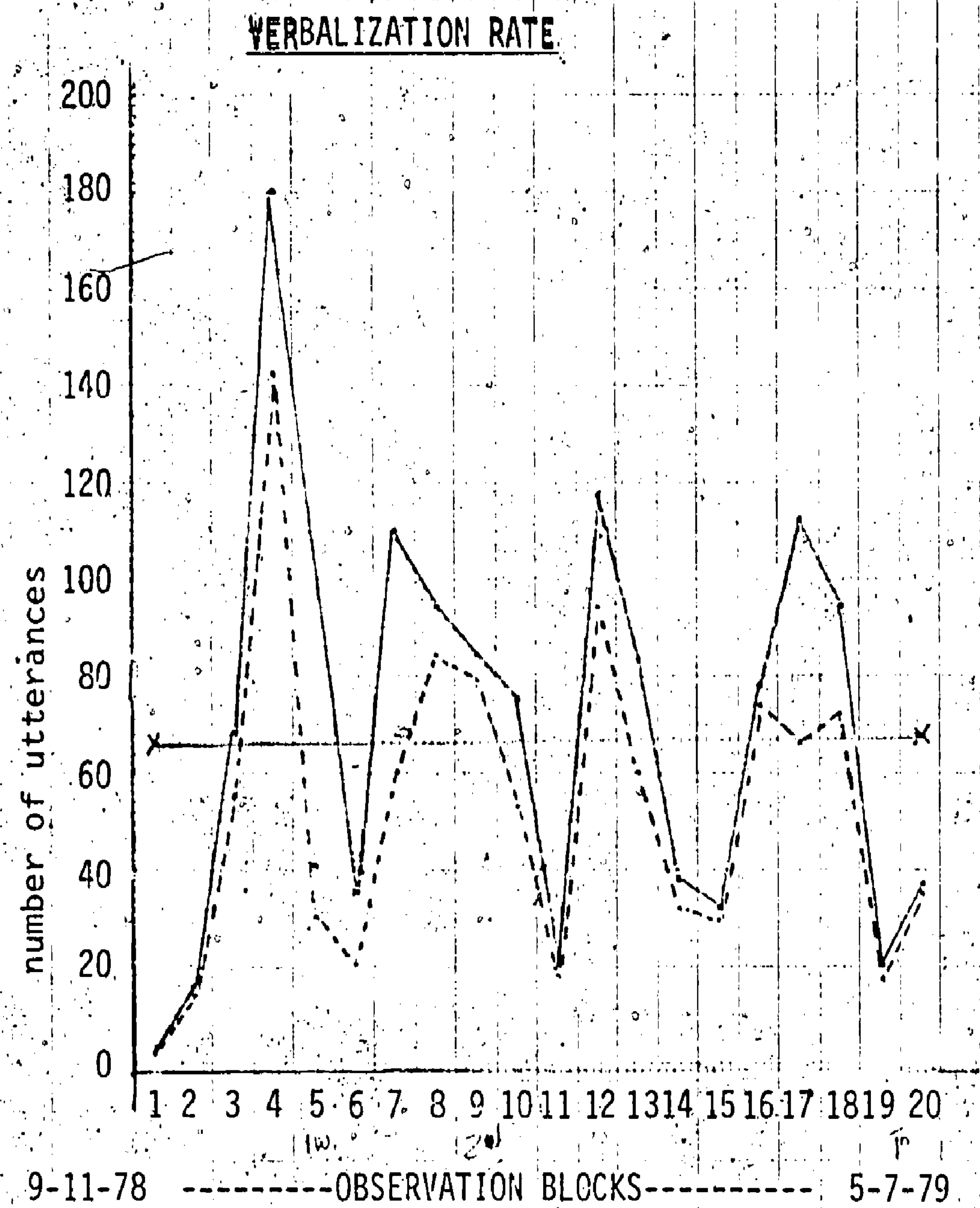
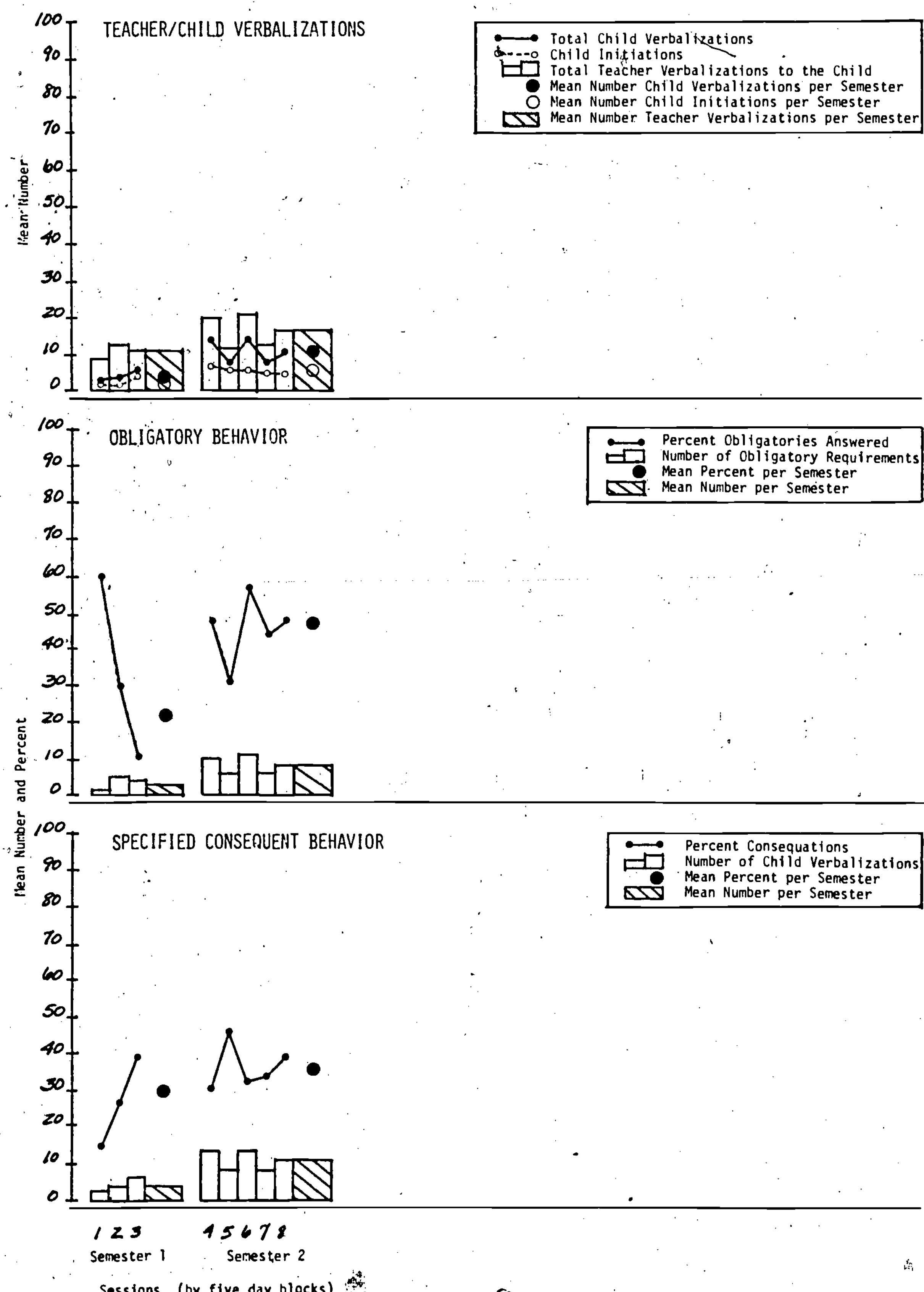



Figure 86

SUBJECT: JI
SITE: LAWR.

Figure 87
VERBAL INTERACTION ANALYSIS

SUBJECT: JI SITE: LAWRENCE



Subject: J.C.

Site: Lawrence

Figures 88 through 92

SUBJECT: JC

# COMPLEXITY MEASURES

SITE: LAWR

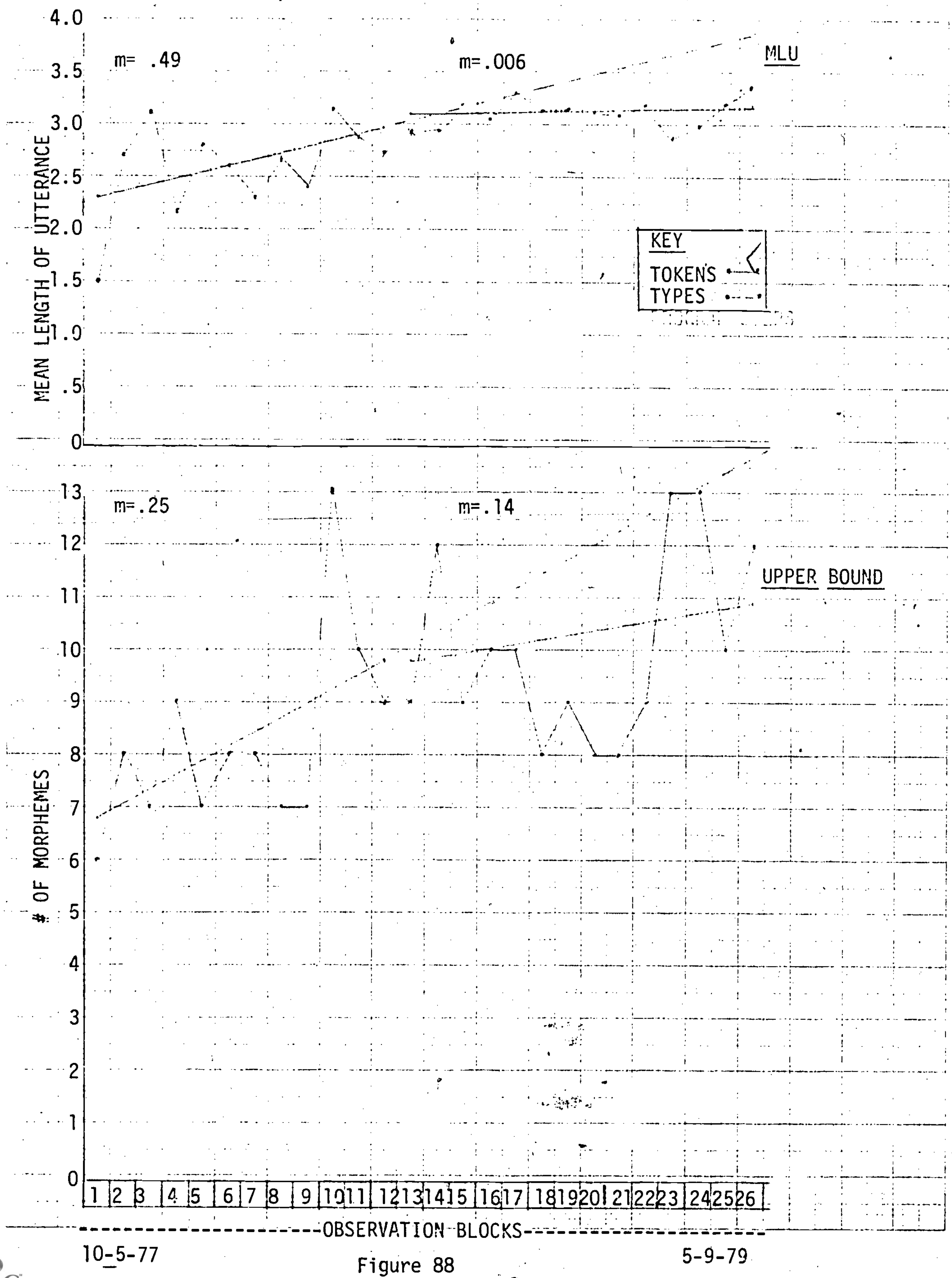



Figure 88

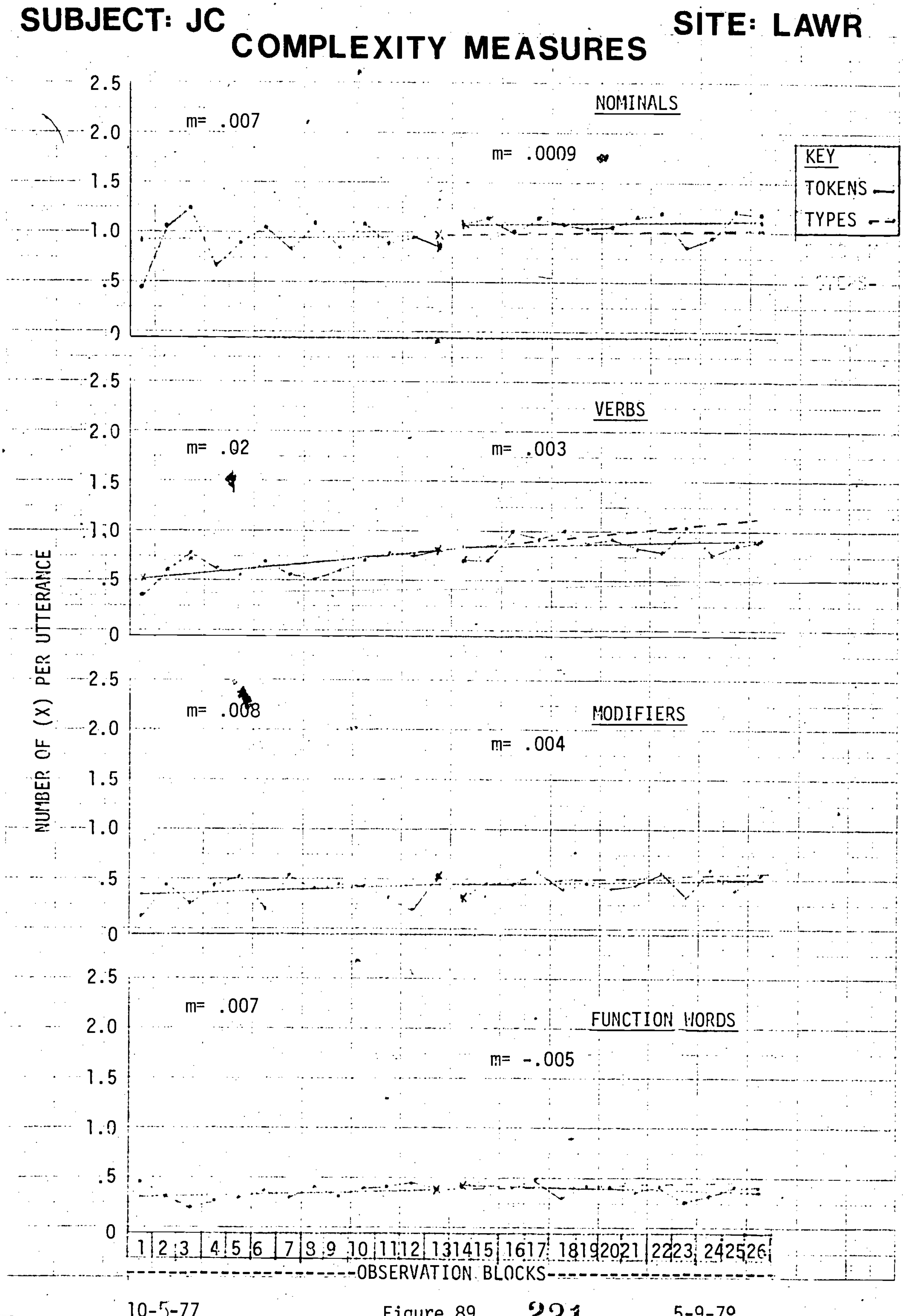

SUBJECT: JC
SITE: LAWR
COMPLEXITY MEASURES
NOMINALS
m= .007
m= .0009
KEY
TOKENS
TYPES
VERBS
m= .02
m= .003
MODIFIERS
m= .008
m= .004
FUNCTION WORDS
m= .007
m= -.005
NUMBER OF (X) PER UTTERANCE
OBSERVATION BLOCKS
10-5-77
5-9-79

Figure 89

SUBJECT: JC SITE: LAWR

MAJOR CATEGORIES

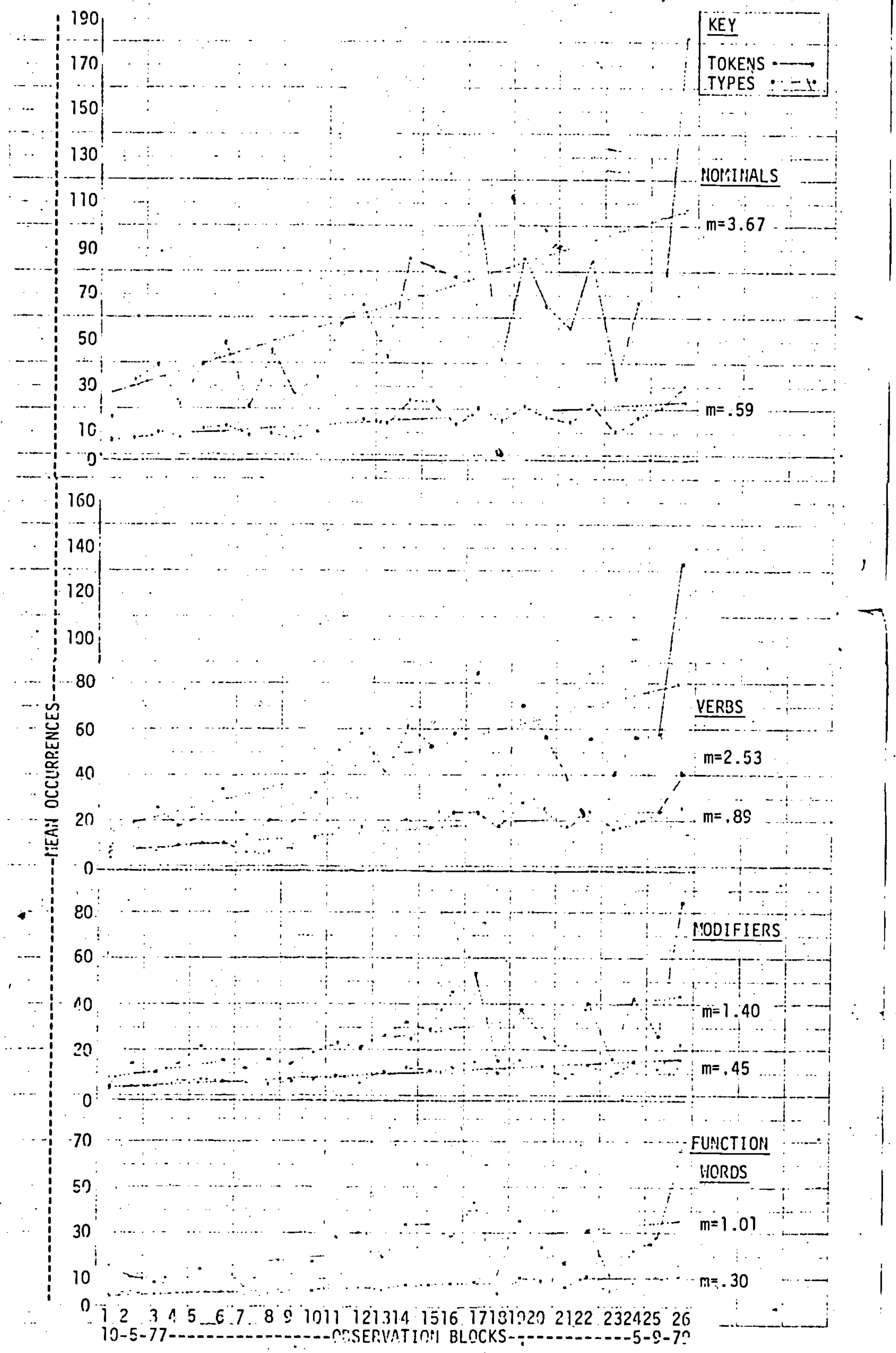



Figure 90

SUBJECT: JC

SITE: LAWR

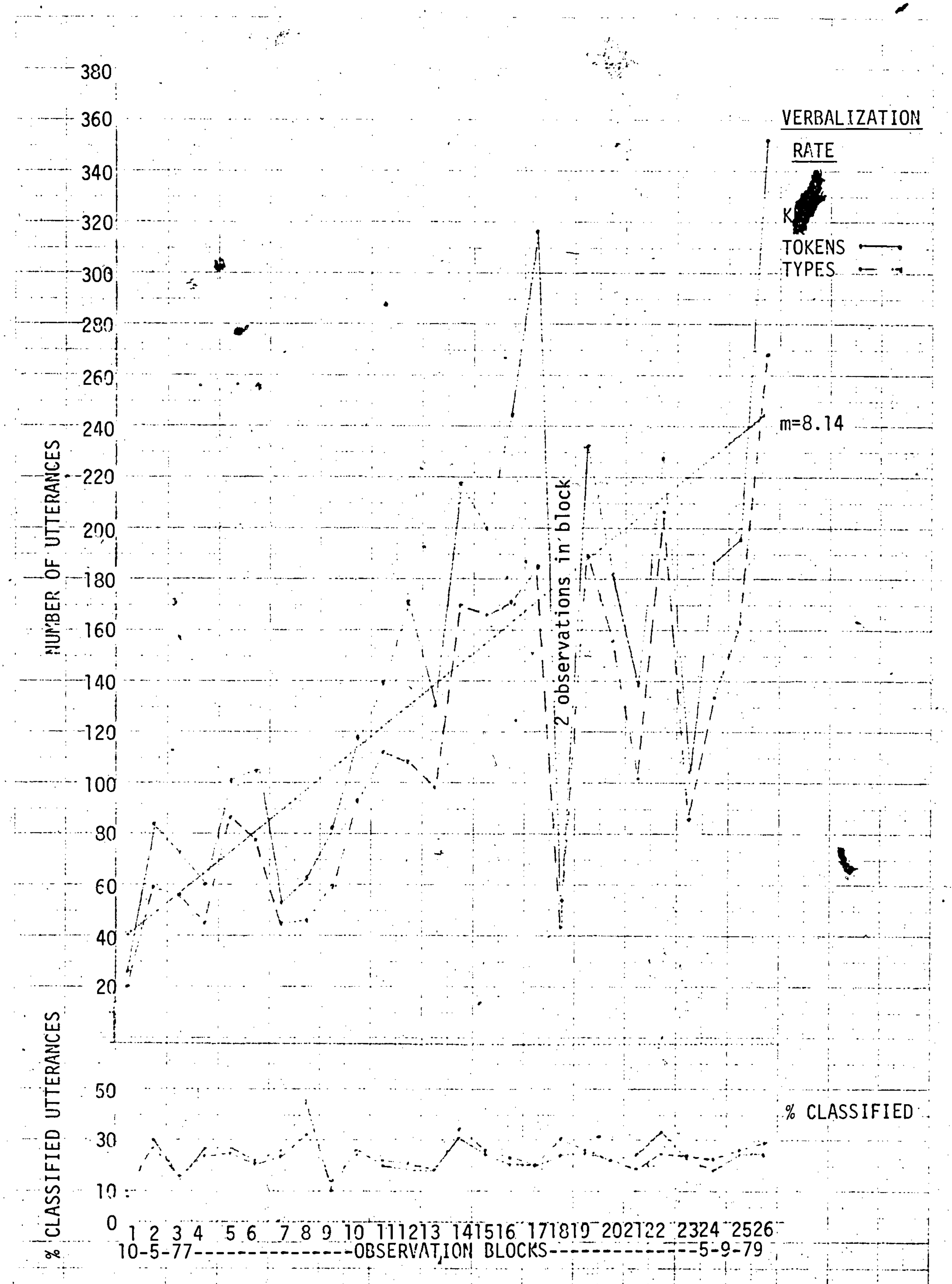



Figure 91

# VERBAL INTERACTION ANALYSIS

SUBJECT: JC SITE: LAWRENCE

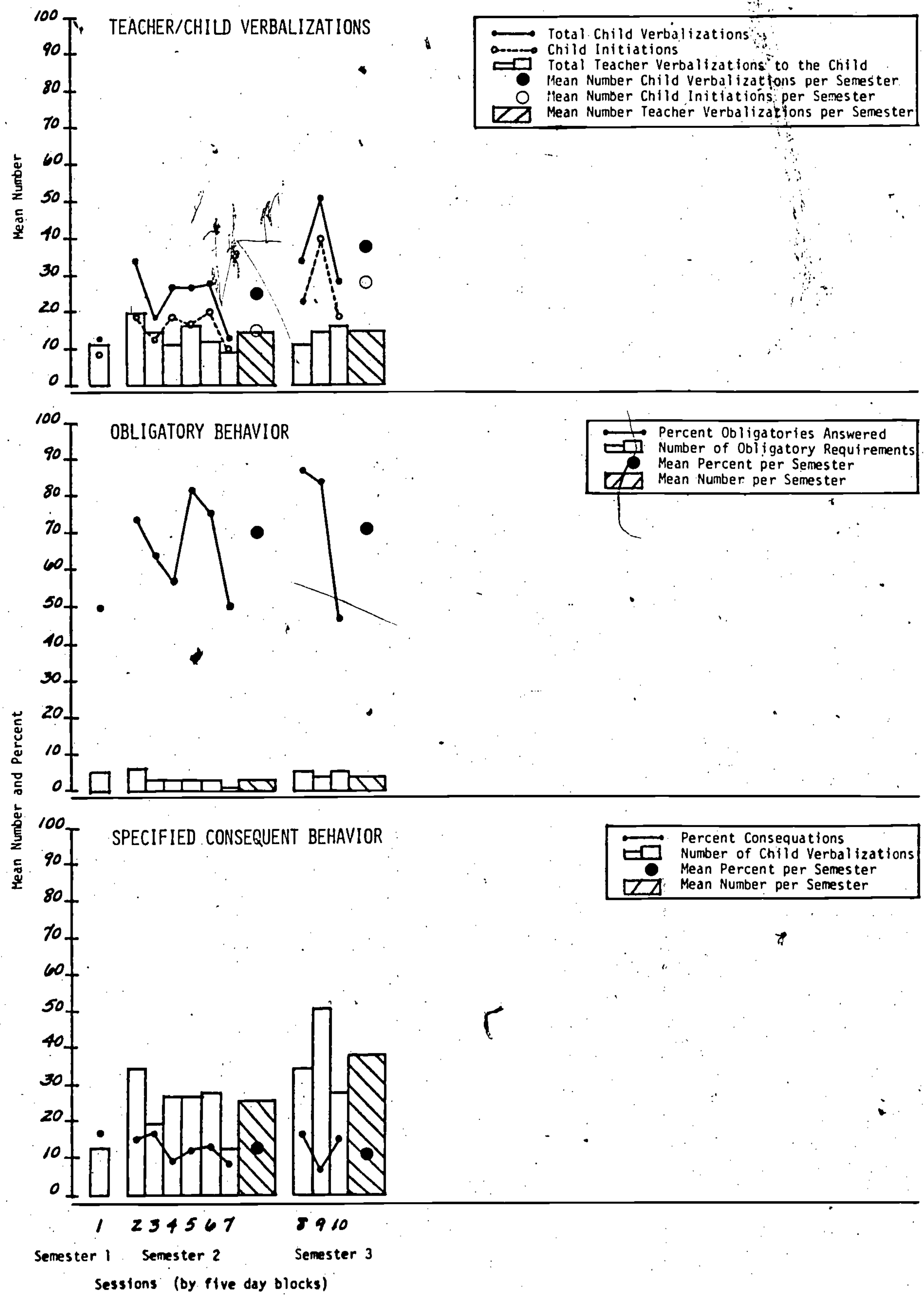



Figure 92

Subject: J.W.

Site: Lawrence

Figures 93 through 97

SUBJECT: JW

SITE: LAWR

# COMPLEXITY MEASURES

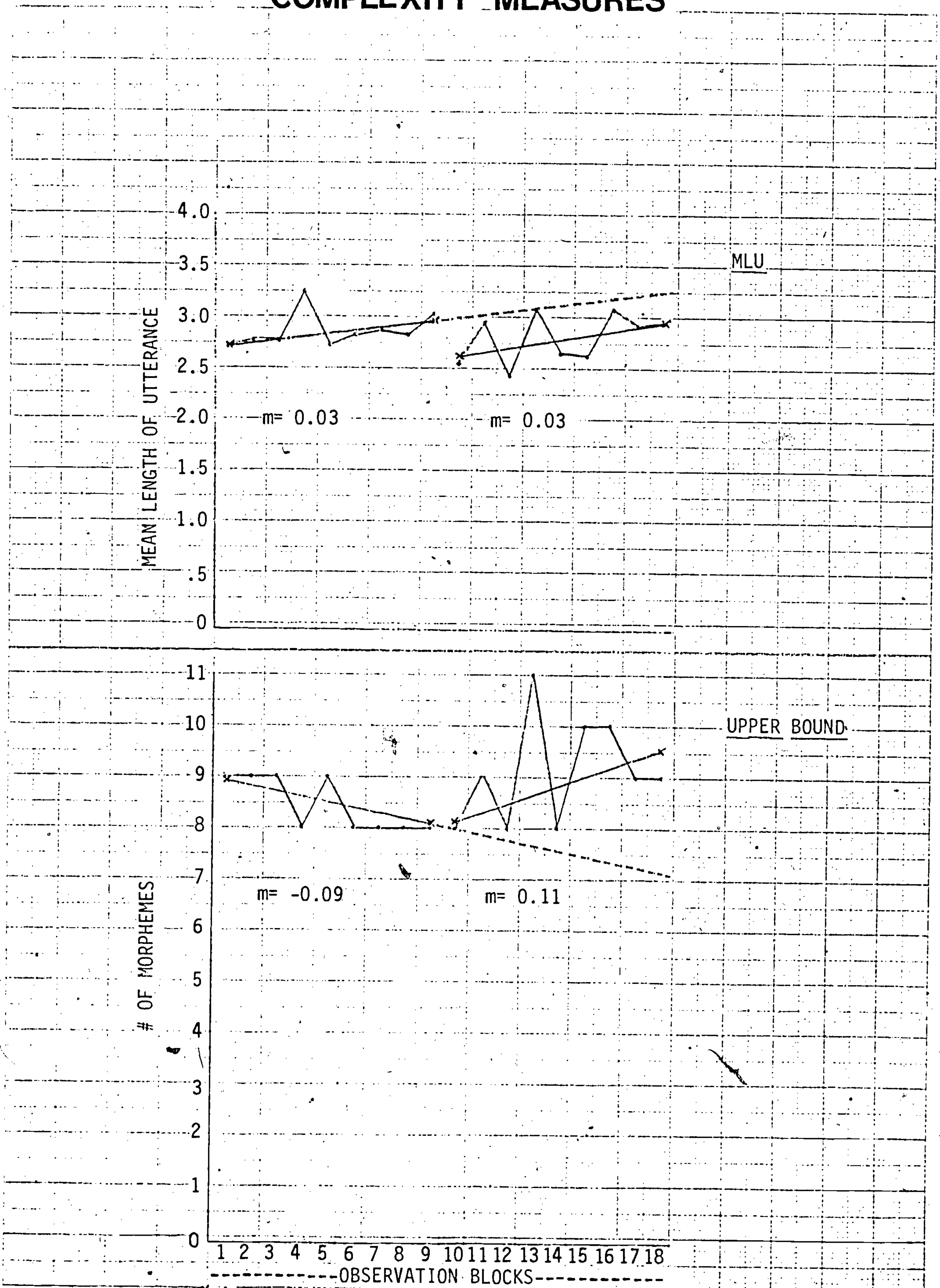



Figure 93

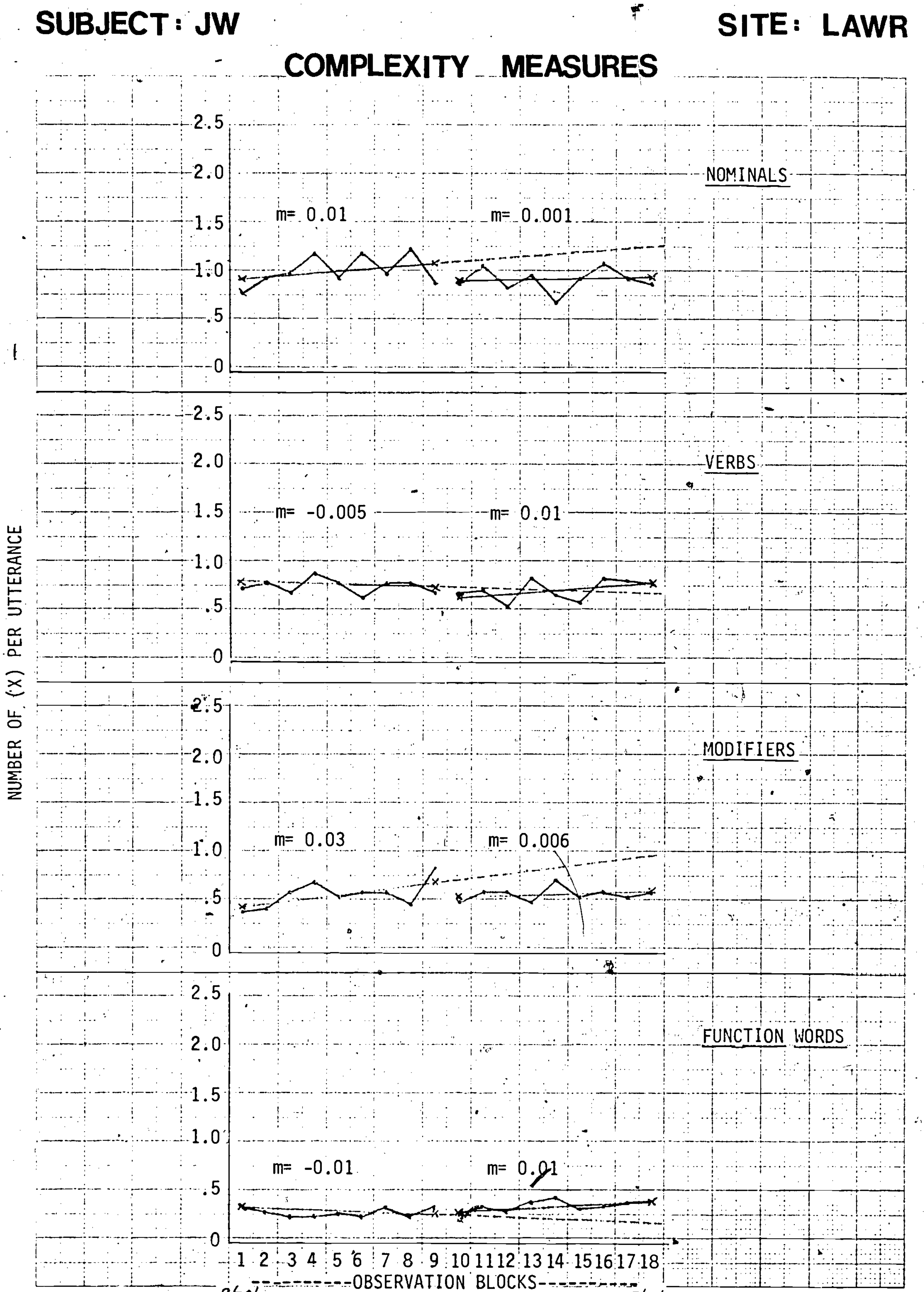

SUBJECT: JW
SITE: LAWR
COMPLEXITY MEASURES
NUMBER OF (X) PER UTTERANCE
NOMINALS
m= 0.01
m= 0.001
VERBS
m= -0.005
m= 0.01
MODIFIERS
m= 0.03
m= 0.006
FUNCTION WORDS
m= -0.01
m= 0.01
OBSERVATION BLOCKS
9/28/76
5/12/77

Figure 94

SUBJECT: JW SITE: LAWR

# MAJOR CATEGORIES

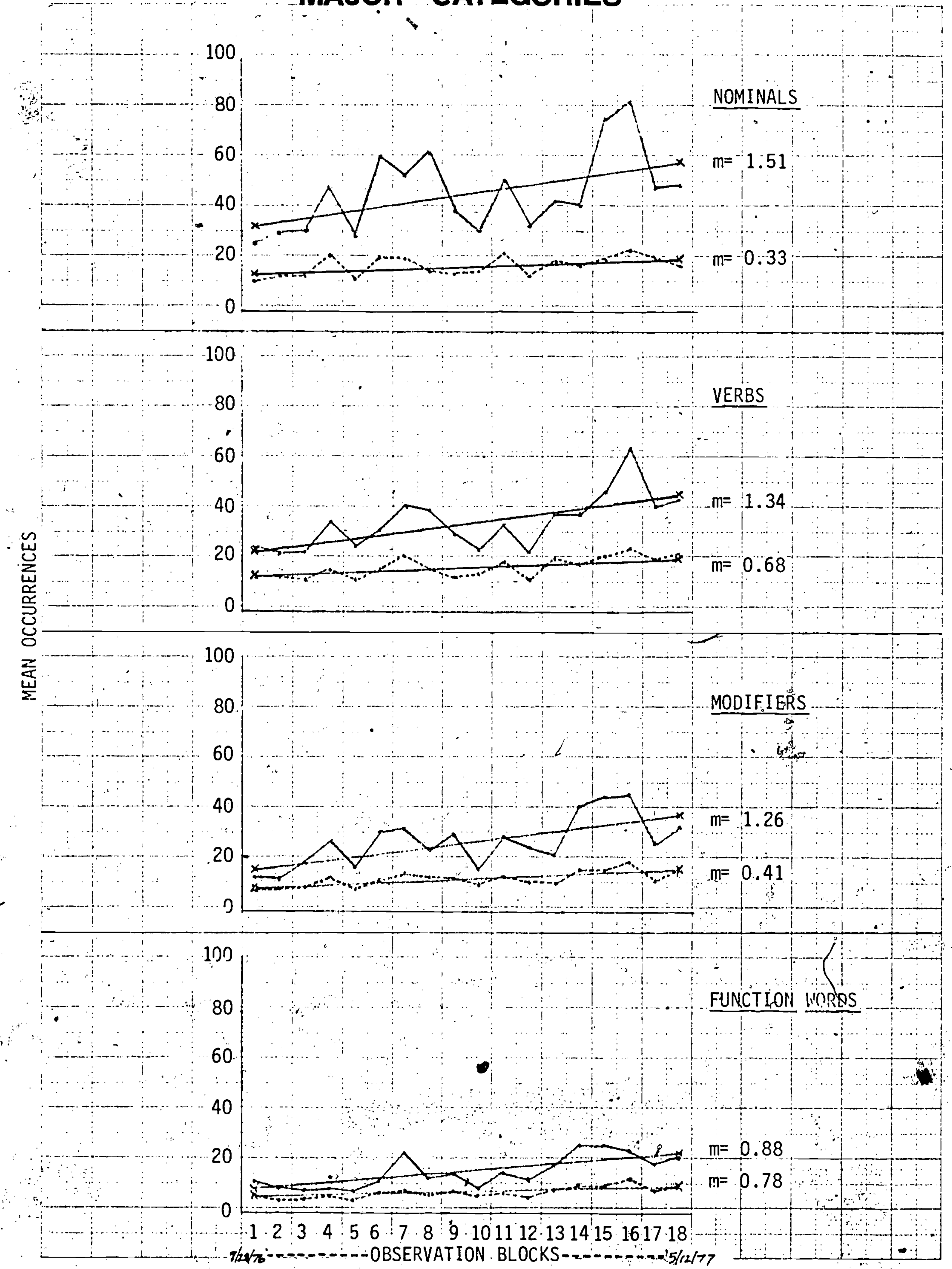



Figure 95

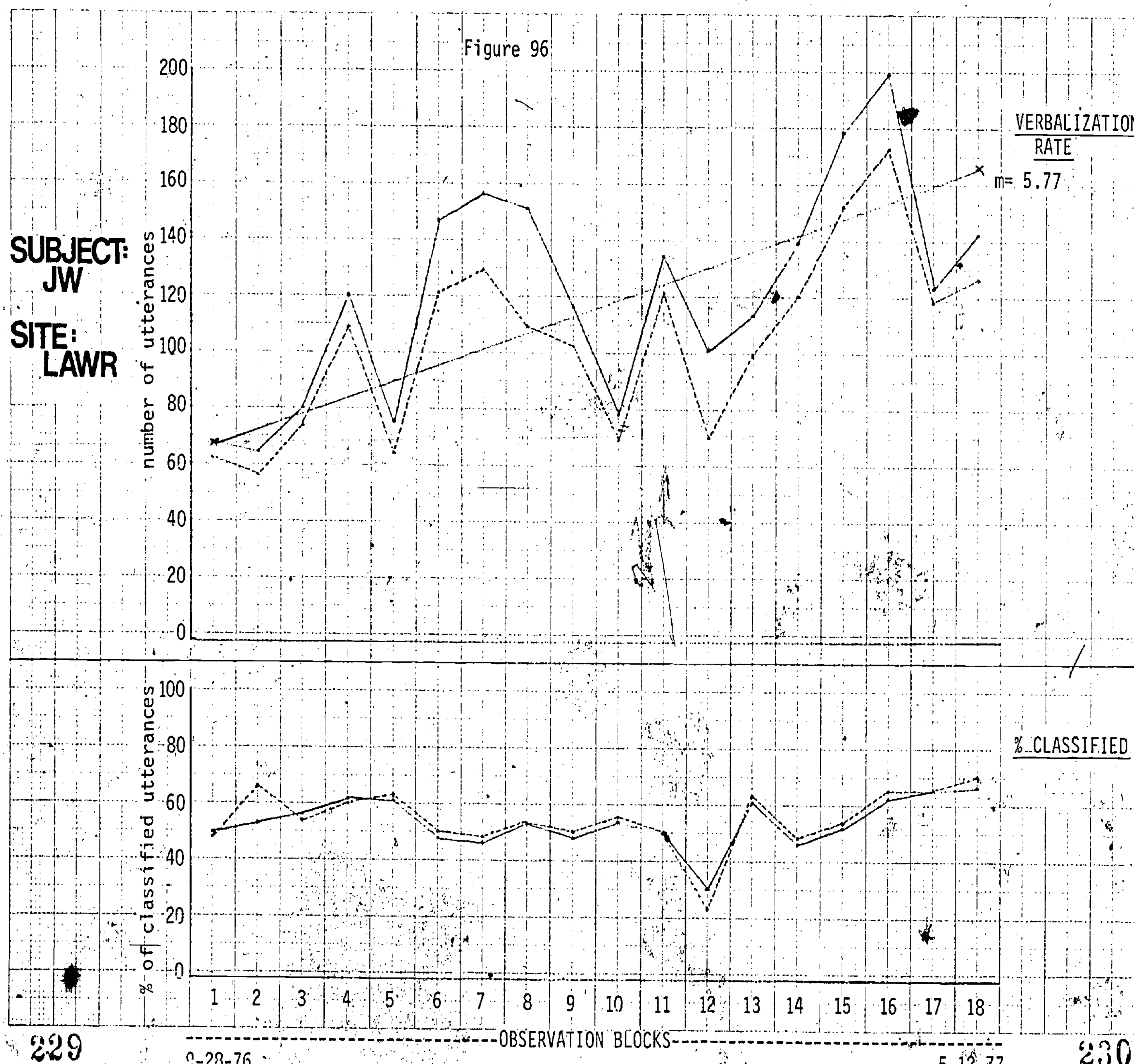
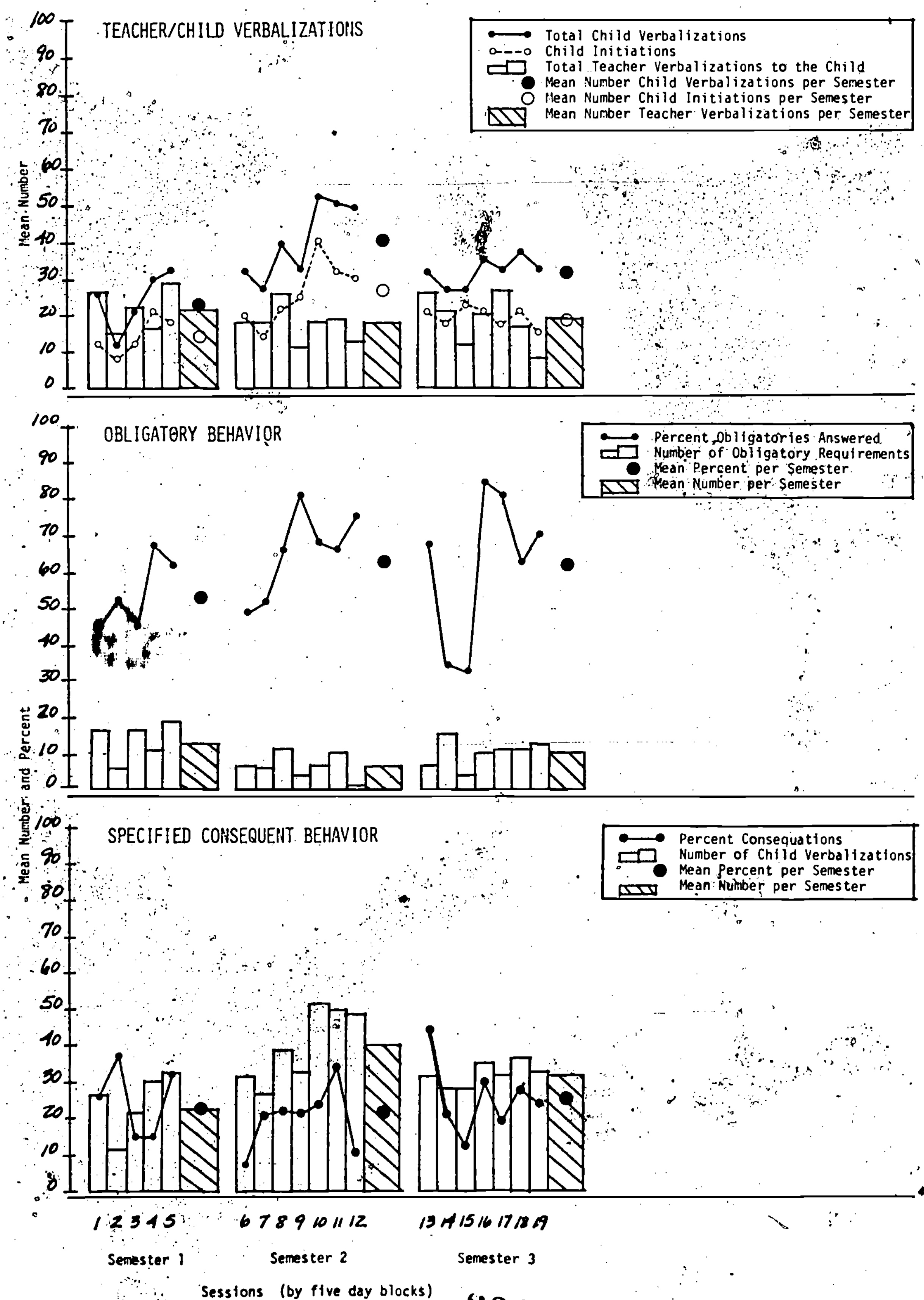


Figure 96
SUBJECT: JW
SITE: LAWR
VERBALIZATION RATE
m= 5.77
number of utterances
200
180
160
140
120
100
80
60
40
20
0
% CLASSIFIED
% of classified utterances
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
OBSERVATION BLOCKS
9-28-76
5-12-77

# VERBAL INTERACTION ANALYSIS

SUBJECT: JW SITE: LAWRENCE




231

Figure 97

Subject: S.Q.

Site: Lawrence

Figures 98 through 102

**SUBJECT: SQ** **SITE: LAWRENCE**

## COMPLEXITY MEASURES

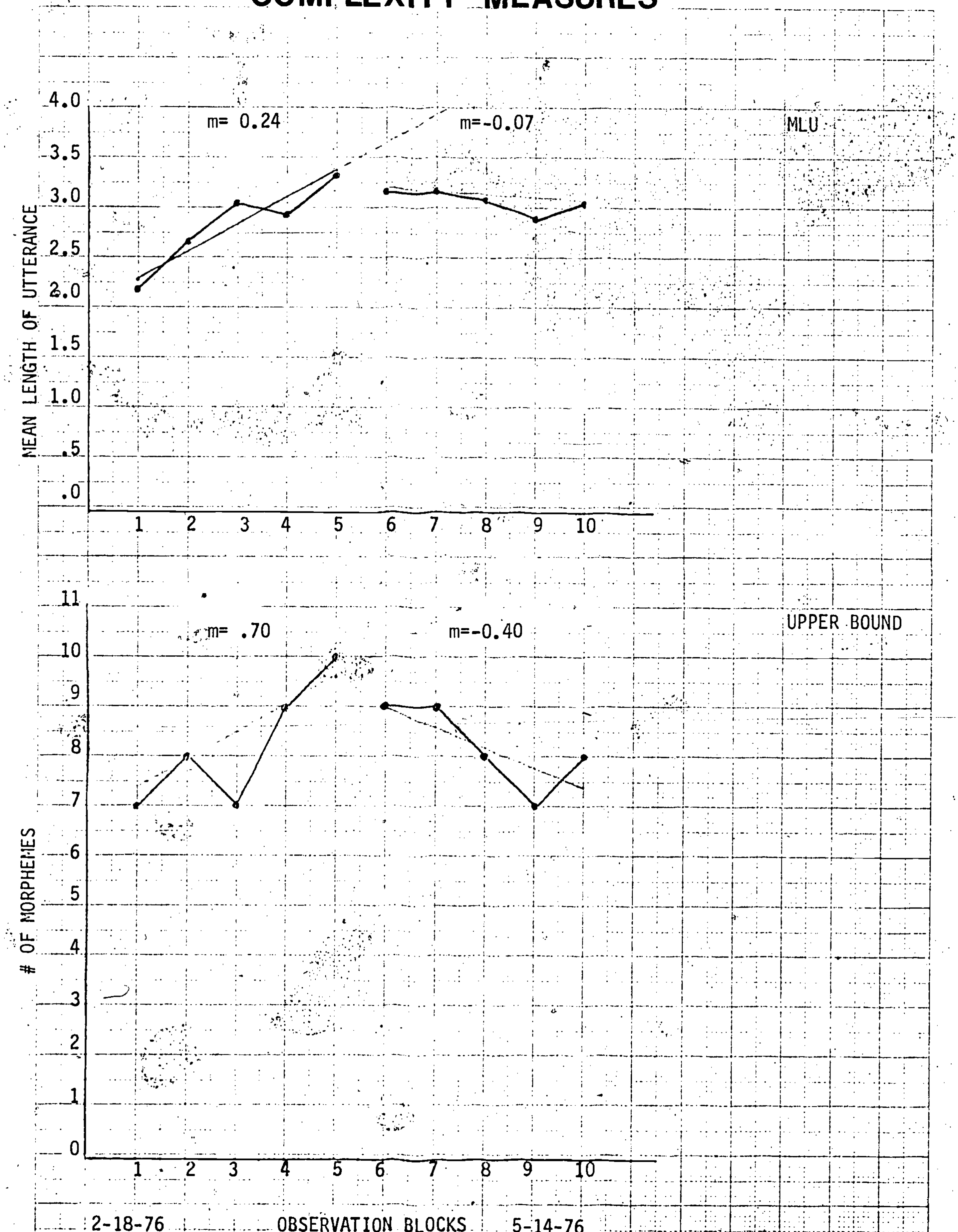



Figure 98

**SUBJECT: SQ** **SITE: LAWRENCE**

## COMPLEXITY MEASURES

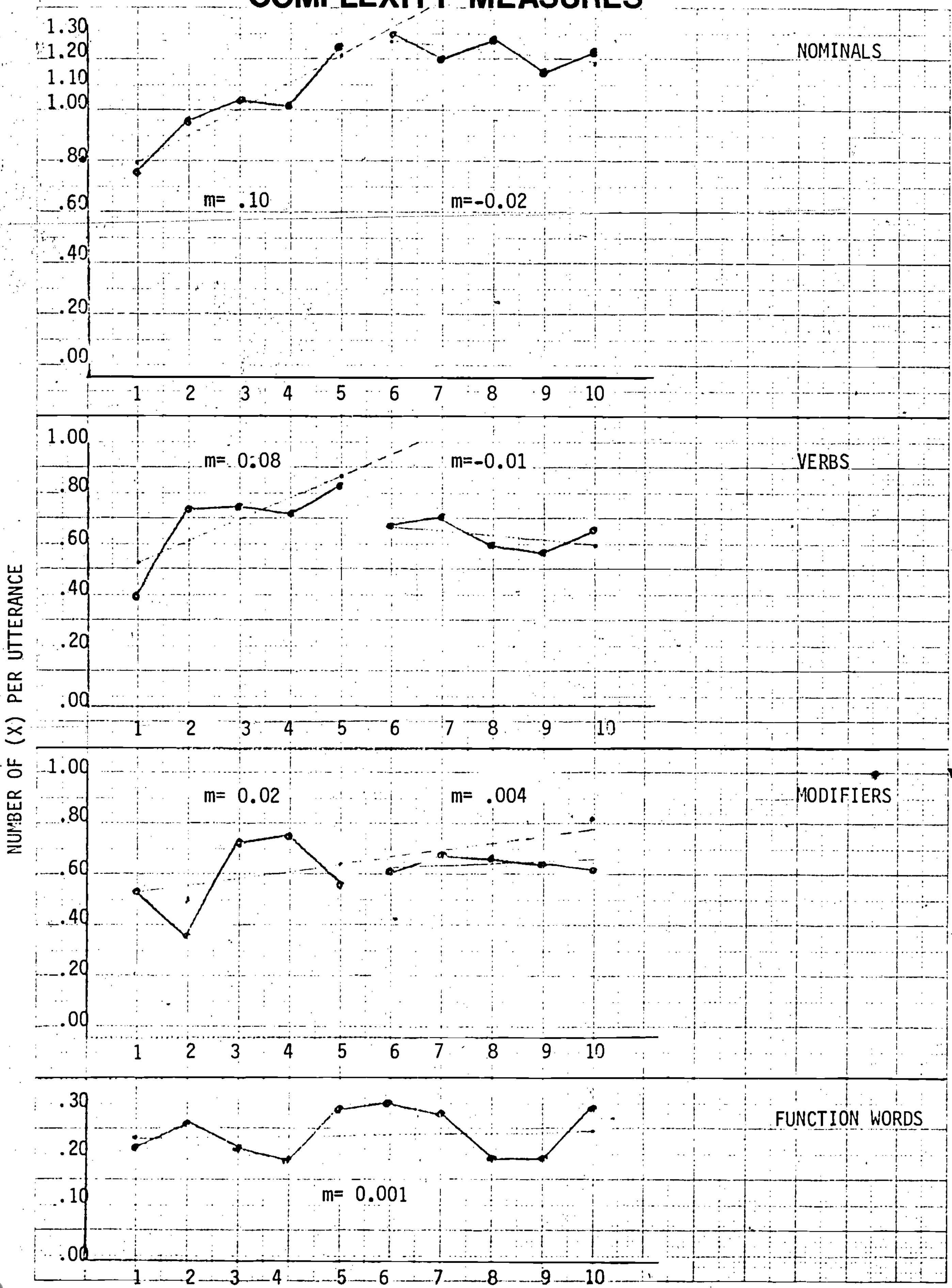



Figure 99

SUBJECT: SQ

SITE: LAWRENCE

# MAJOR CATEGORIES

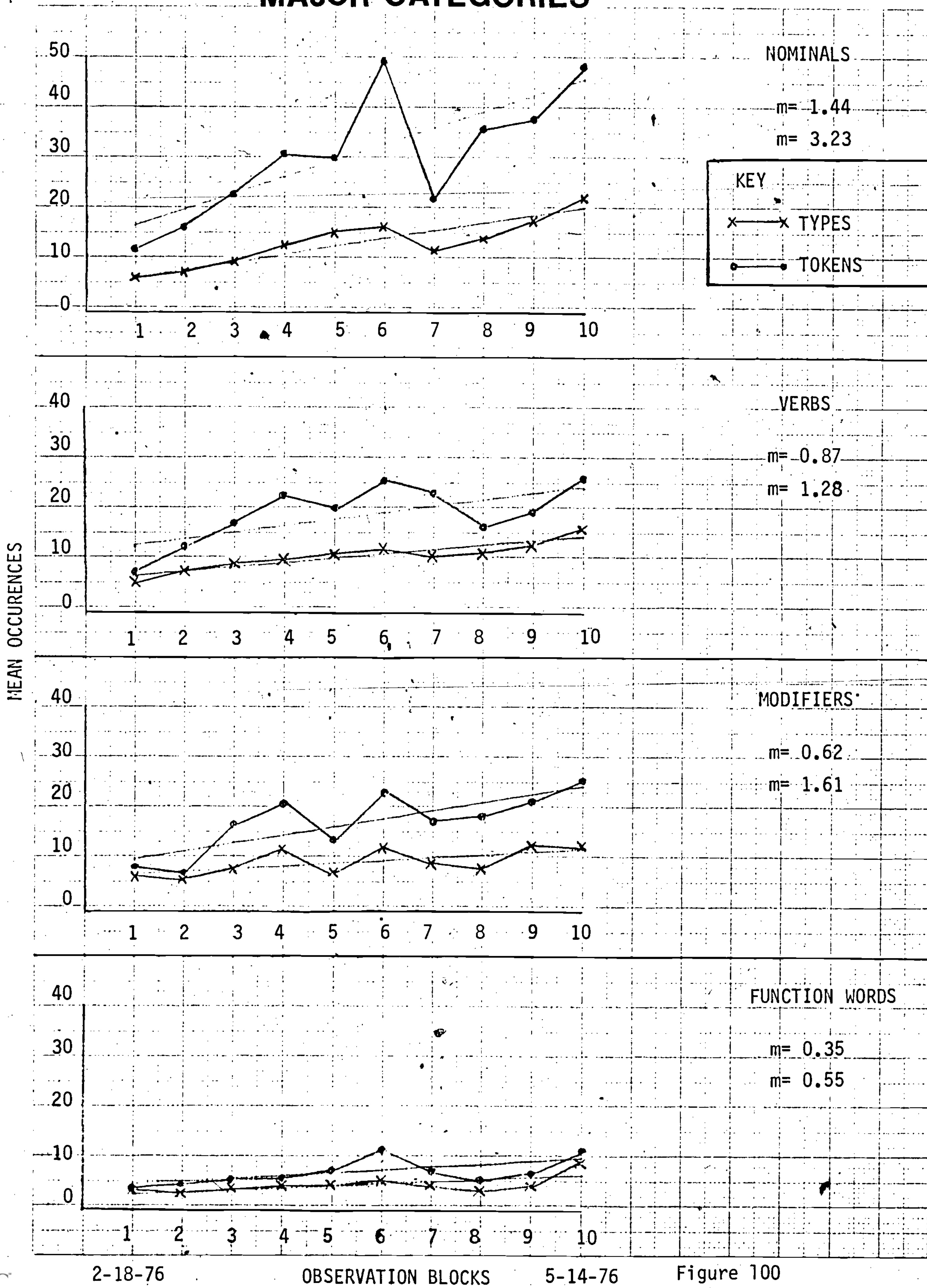
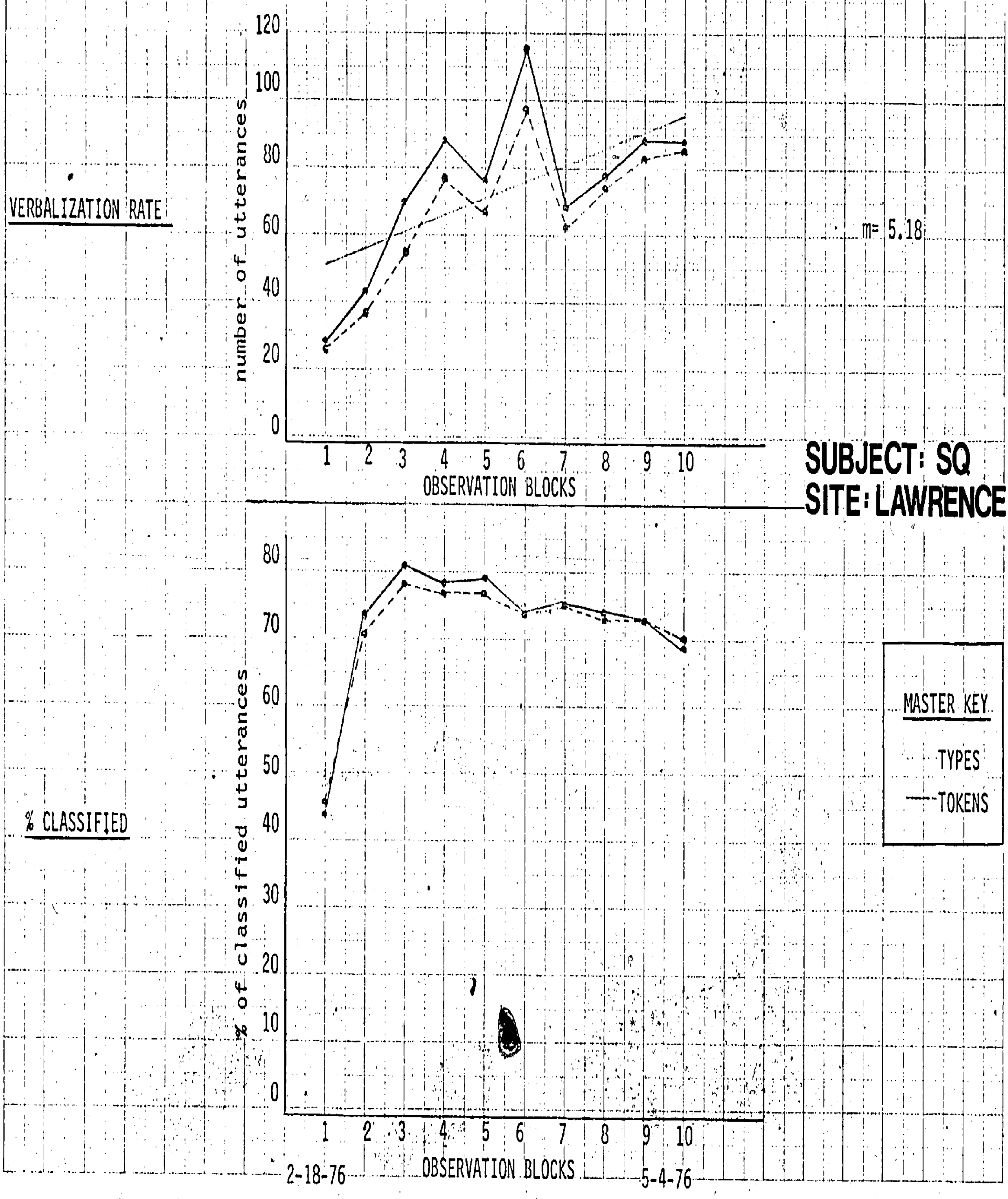



Figure 100

Figure 101


VERBALIZATION RATE
number of utterances
120
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10
OBSERVATION BLOCKS
m= 5.18
SUBJECT: SQ
SITE: LAWRENCE
% CLASSIFIED
% of classified utterances
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10
2-18-76
OBSERVATION BLOCKS
5-4-76
MASTER KEY
TYPES
TOKENS

## VERBAL INTERACTION ANALYSIS

SUBJECT: SQ

SITE: LAWRENCE

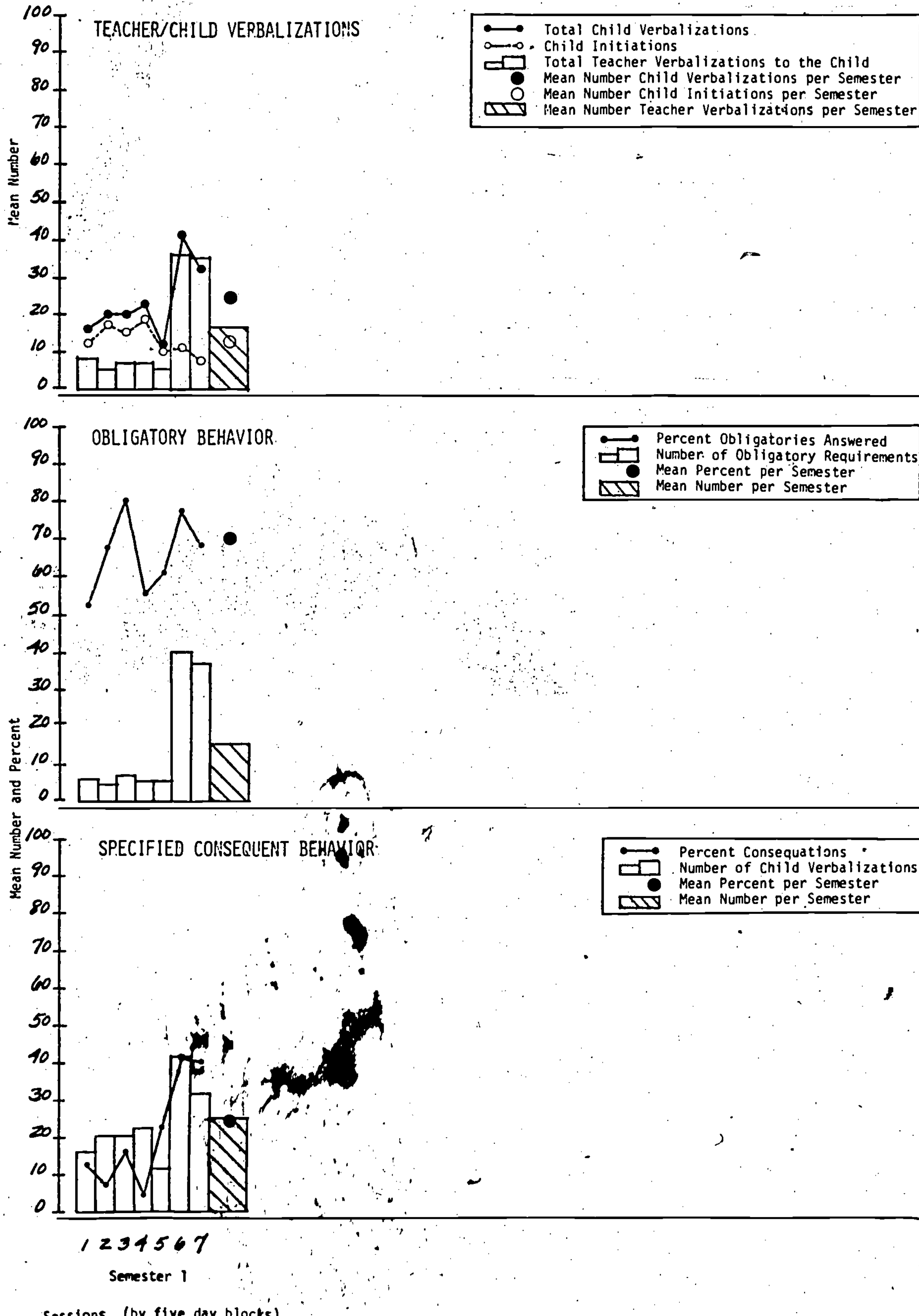



Figure 102

Subject: C.U.

Site: Lawrence

Figures 103 through 107

SUBJECT: CU

SITE: LAWRENCE

# COMPLEXITY MEASURES

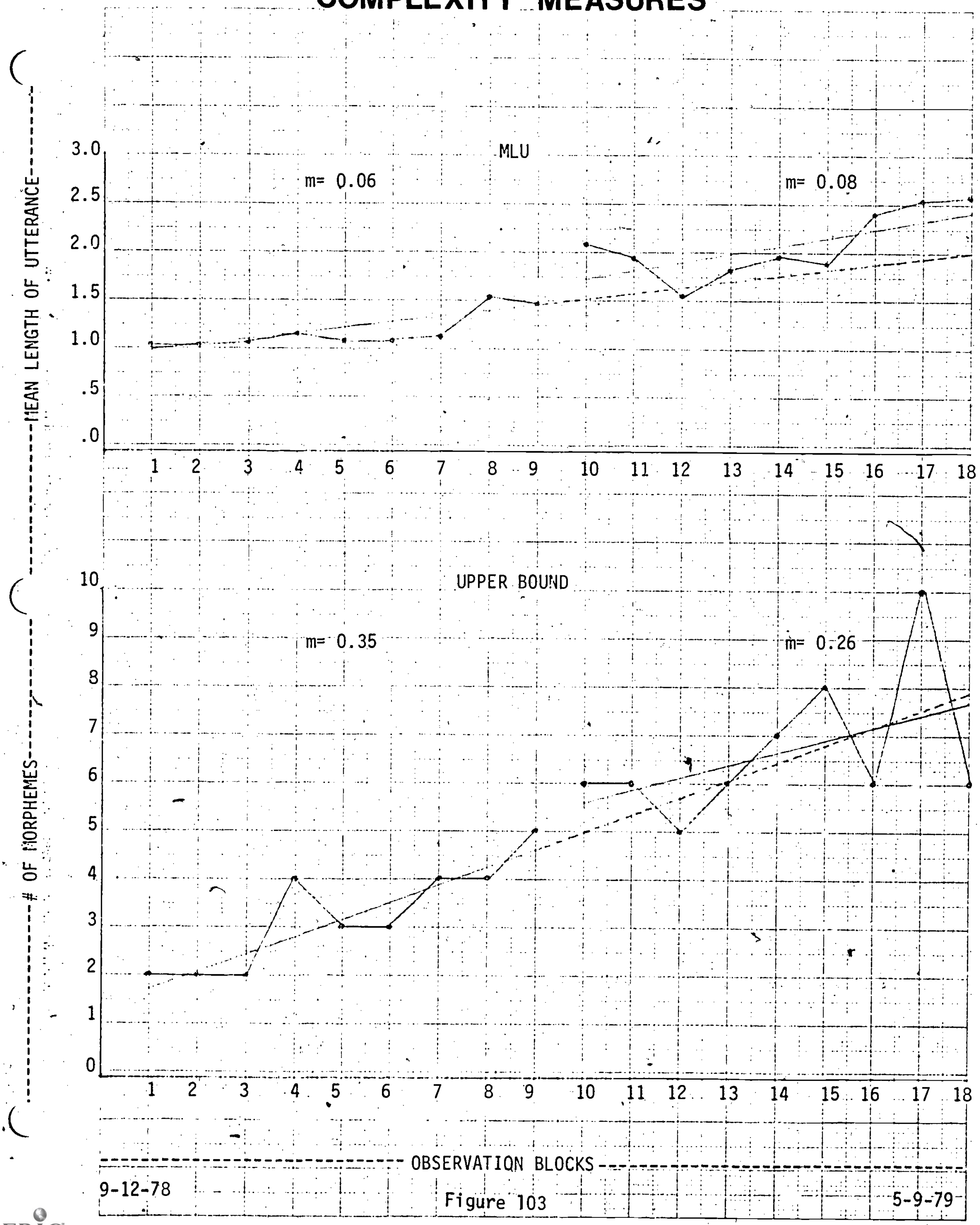
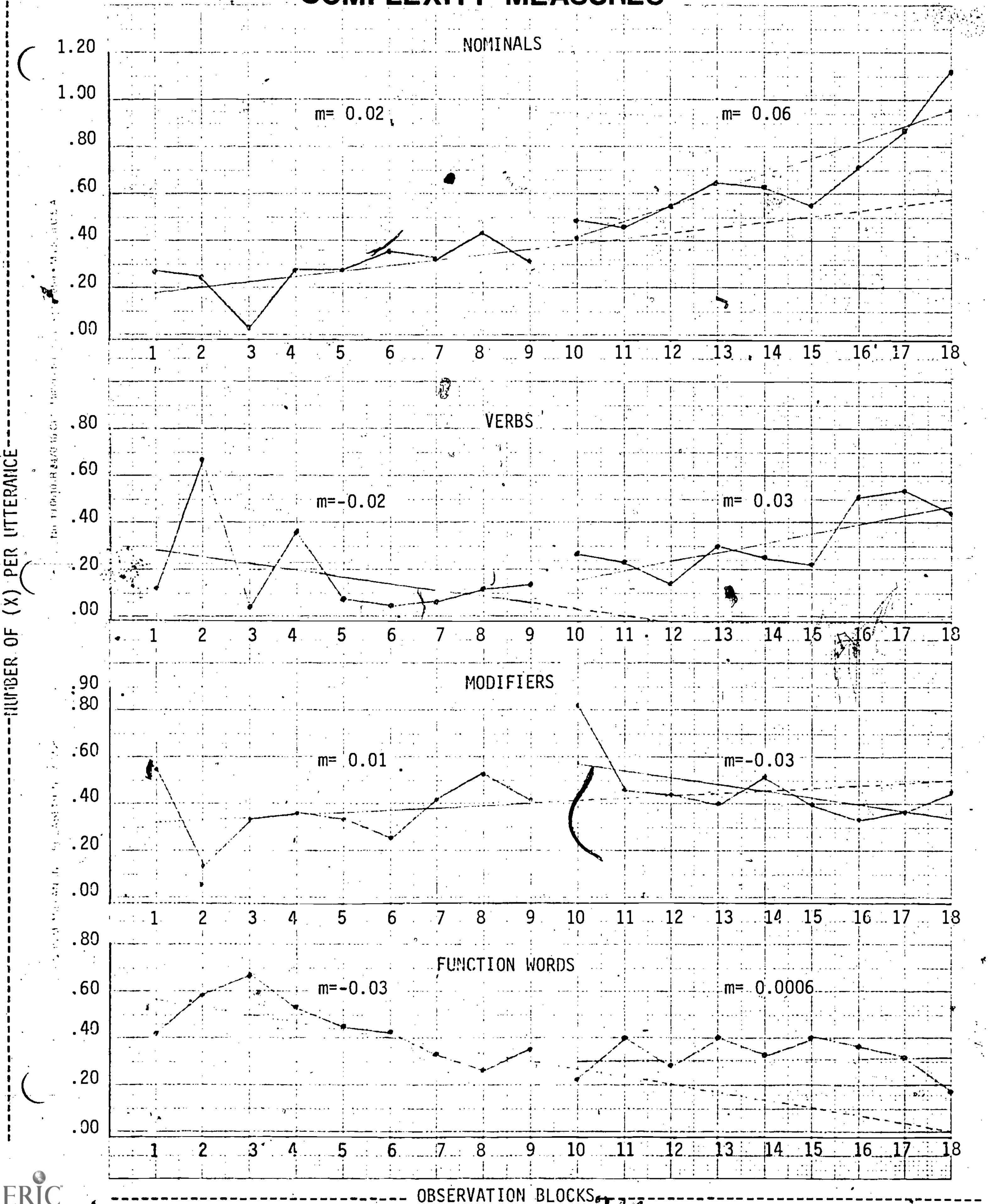



Figure 103

SUBJECT: CU SITE: LAWRENCE

# COMPLEXITY MEASURES




9-12-78

Figure 104

subject: cu site: lawrence

major categories

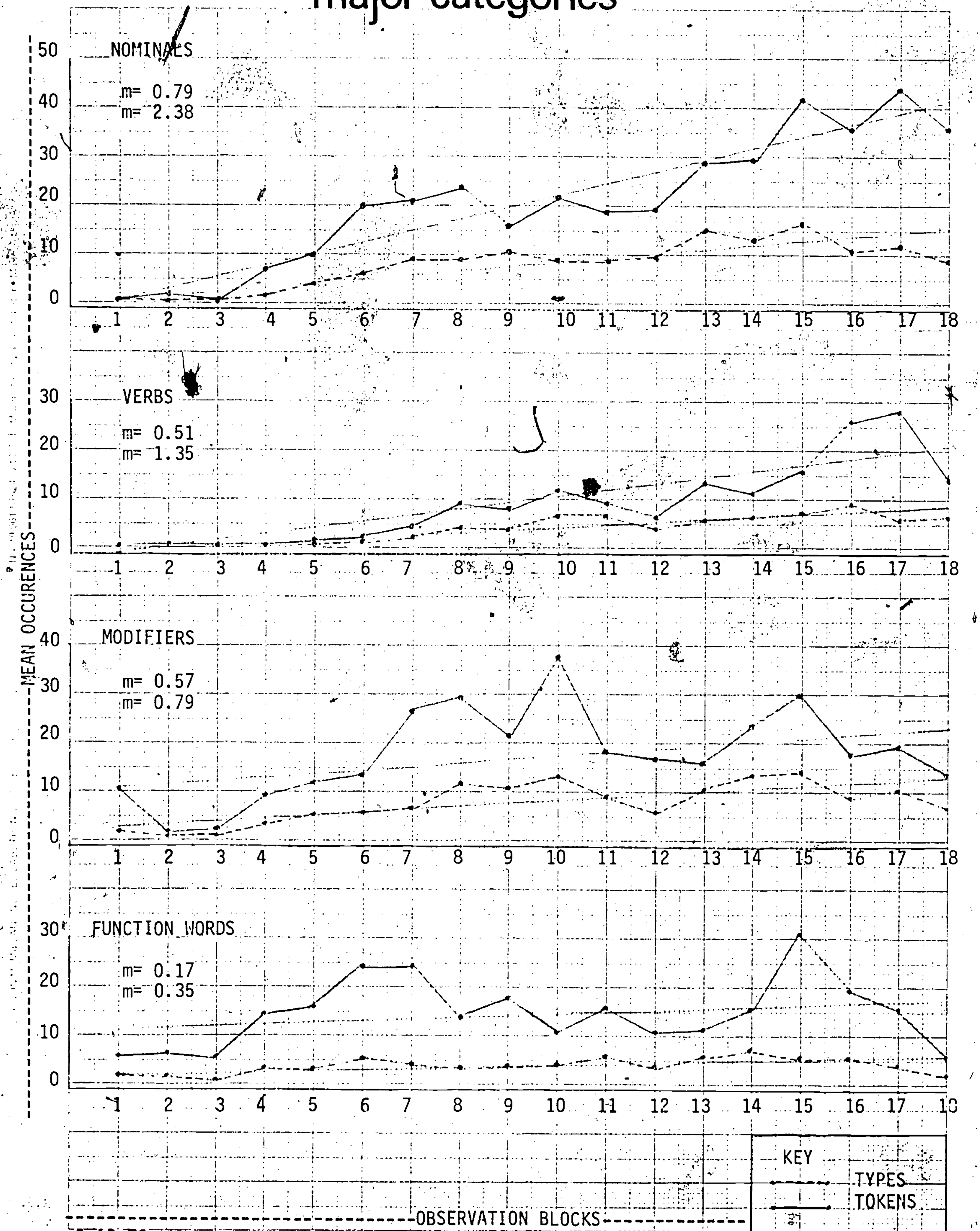



Figure 105

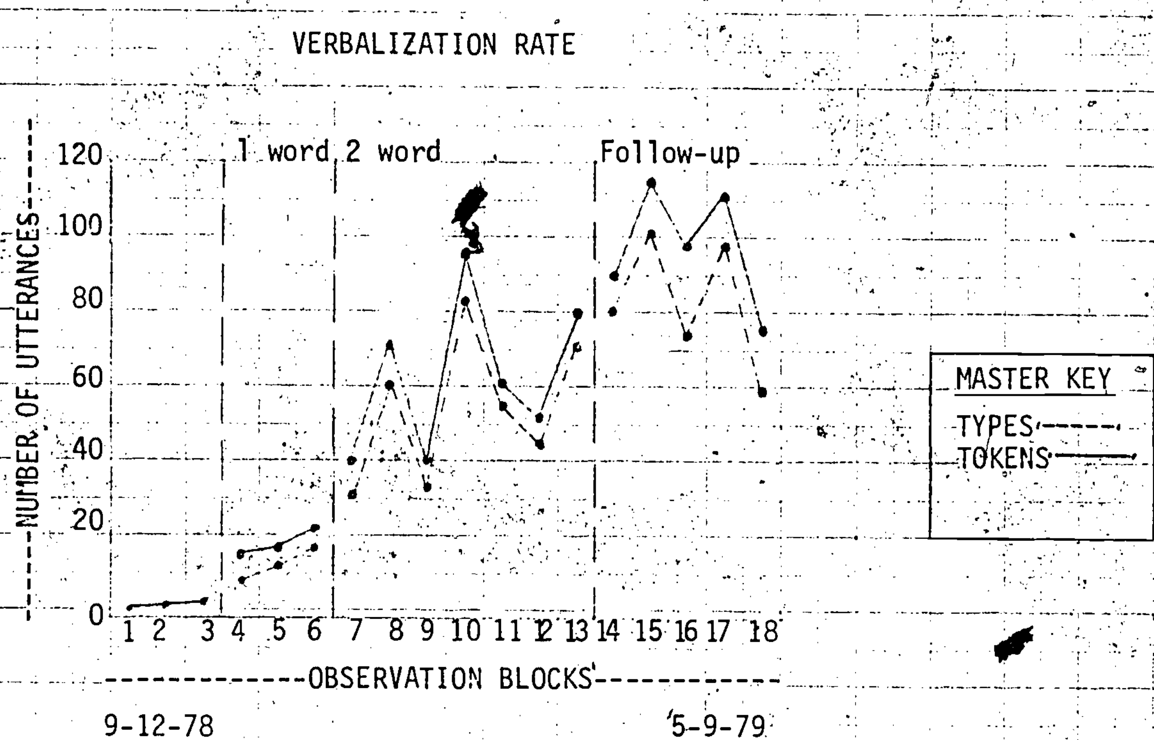

VERBALIZATION RATE
1 word
2 word
Follow-up
NUMBER OF UTTERANCES
0
20
40
60
80
100
120
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
OBSERVATION BLOCKS
9-12-78
5-9-79
MASTER KEY
TYPES
TOKENS

Figure 106

# VERBAL INTERACTION ANALYSIS

SUBJECT: CU

SITE: LAWRENCE

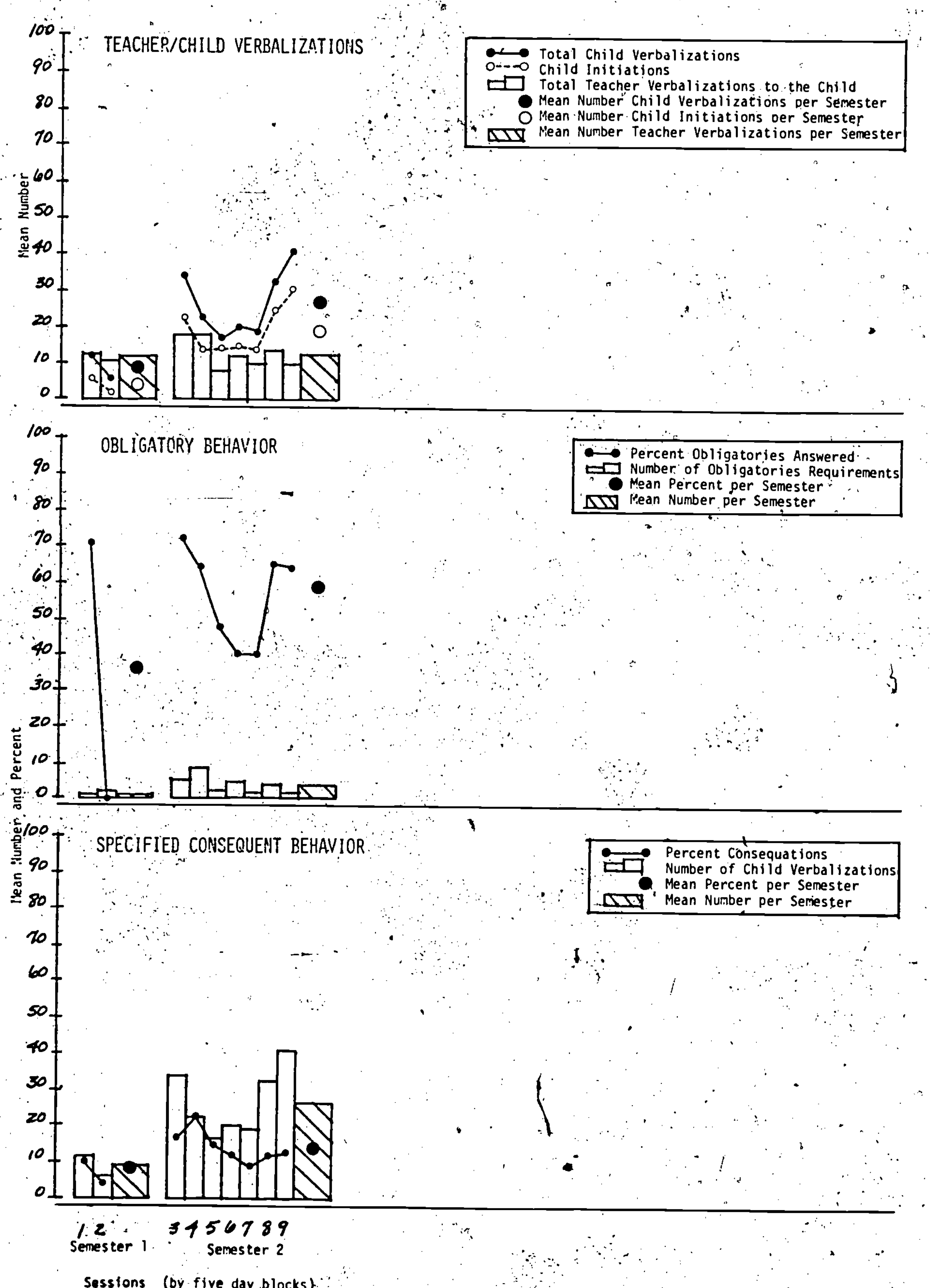



Figure 107

Subject: D.A.

Site: Lawrence

Figures 108 through 113

Figure 108

# Complexity Measures

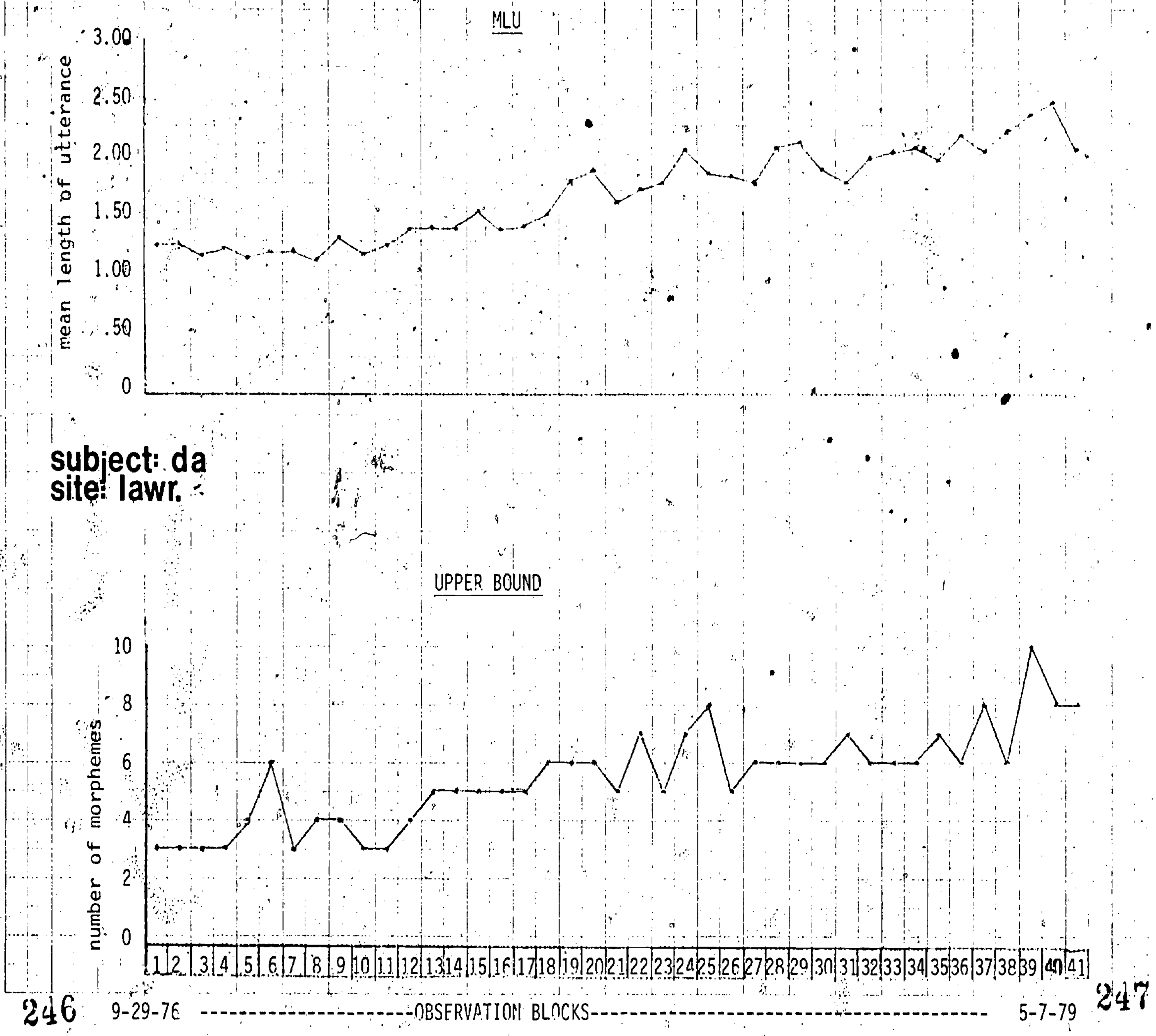
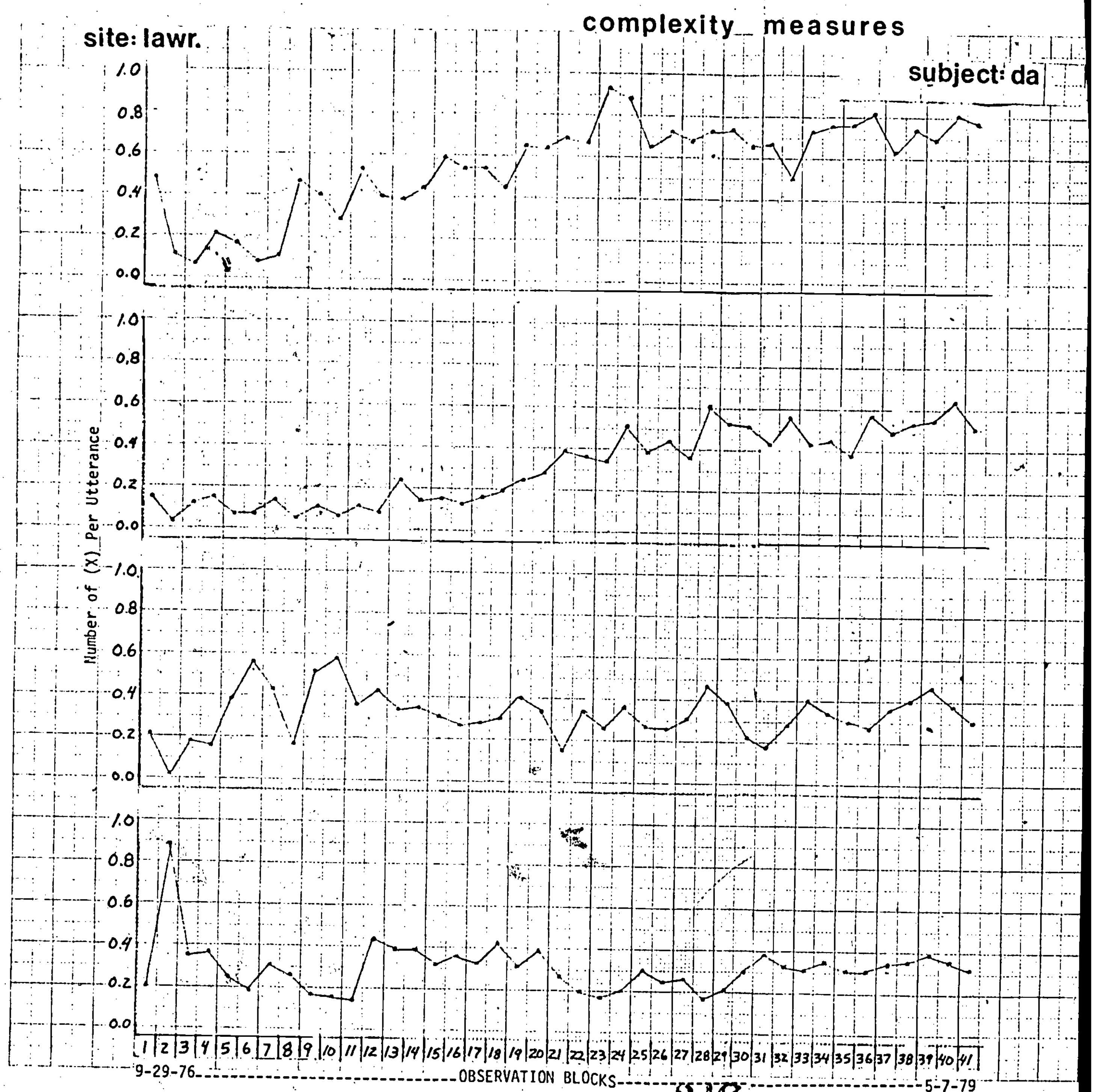


Figure 109


site: lawr.
complexity measures
subject: da
Number of (X) Per Utterance
1.0
0.8
0.6
0.4
0.2
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41
9-29-76
OBSERVATION BLOCKS
5-7-79

subject: da major categories site: lawr.

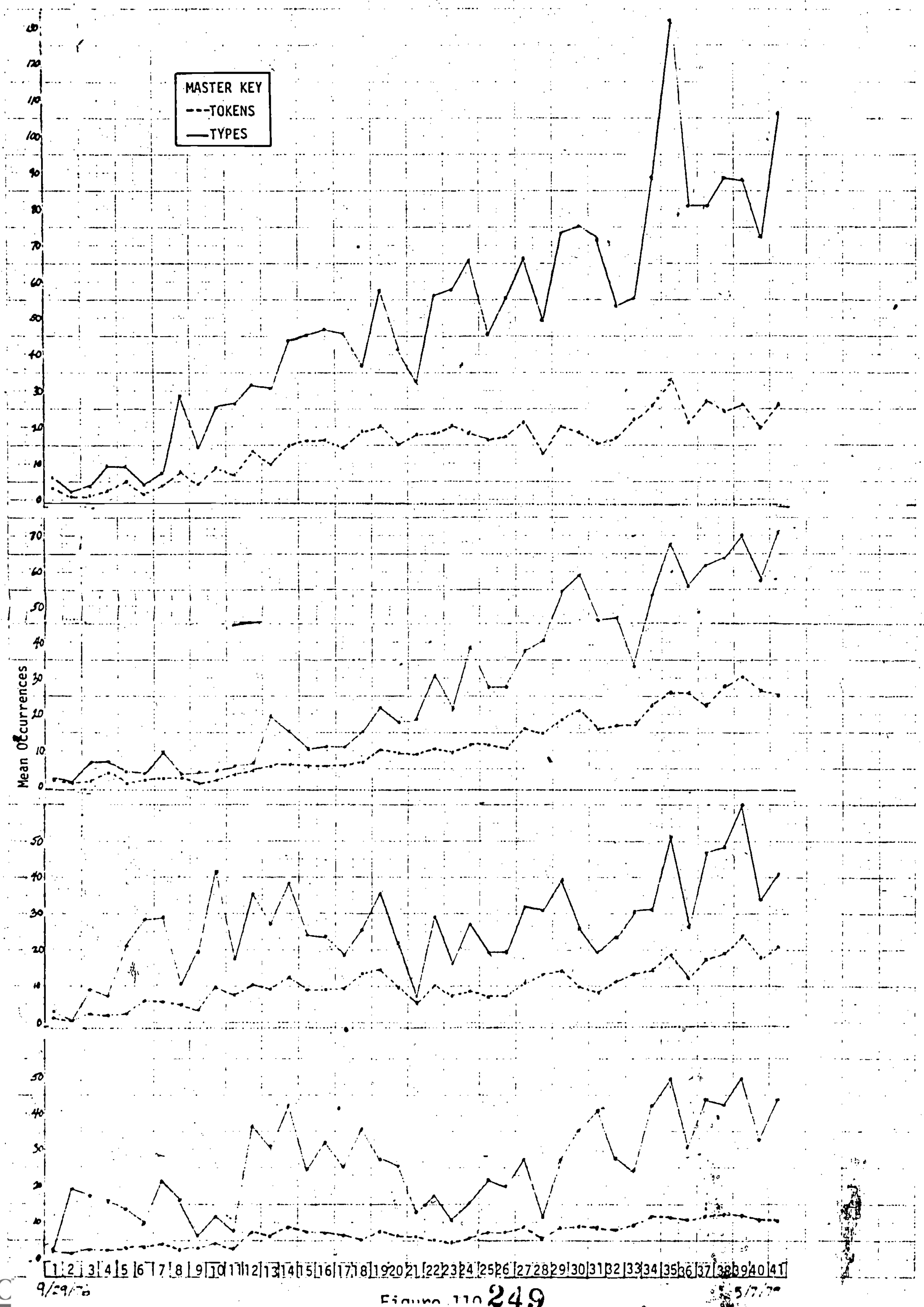



Figure 110 249

subject: DA
site: Lawr.

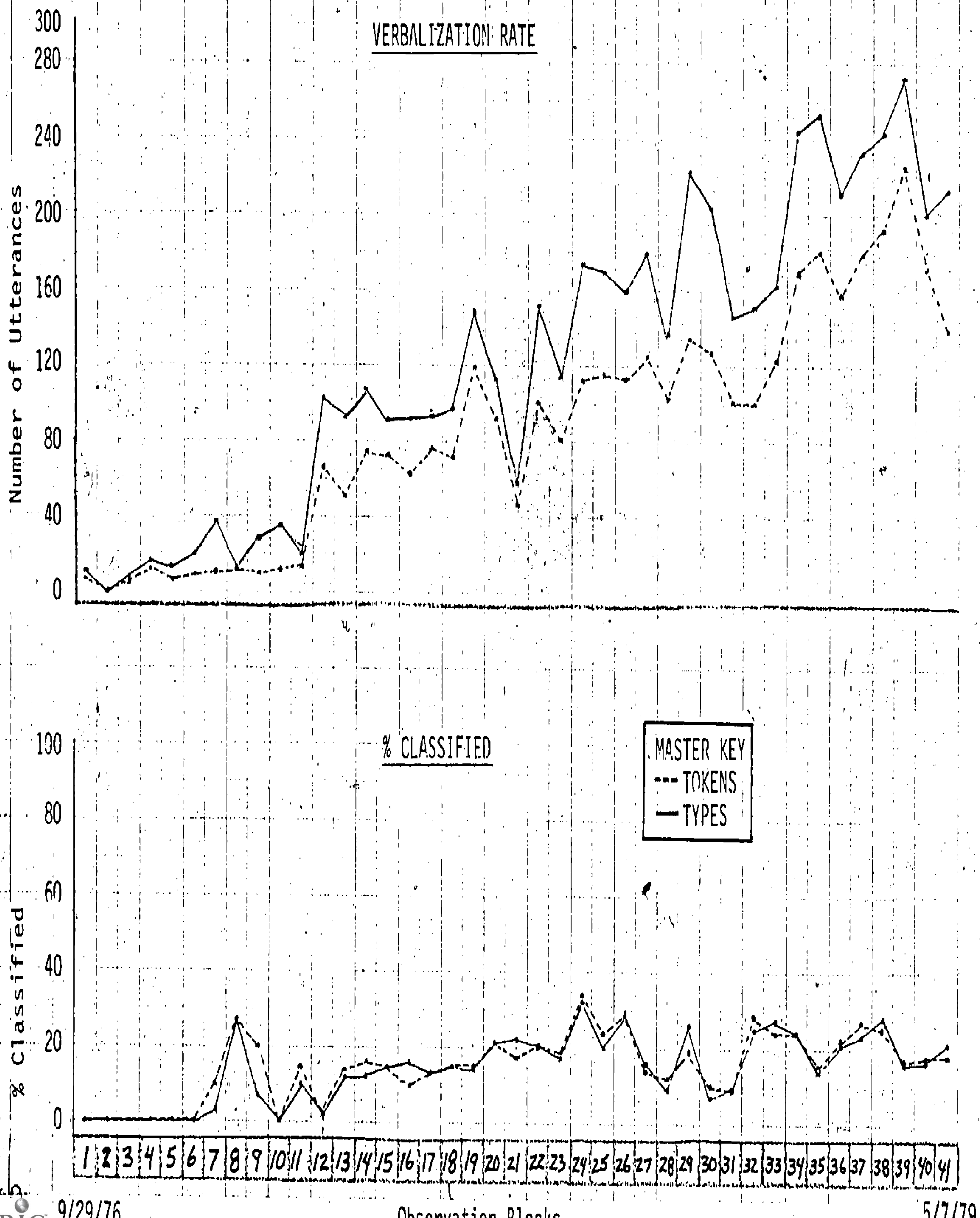



Figure 111

## VERBAL INTERACTION ANALYSIS

SUBJECT: DA                                                                 SITE: LAWRENCE

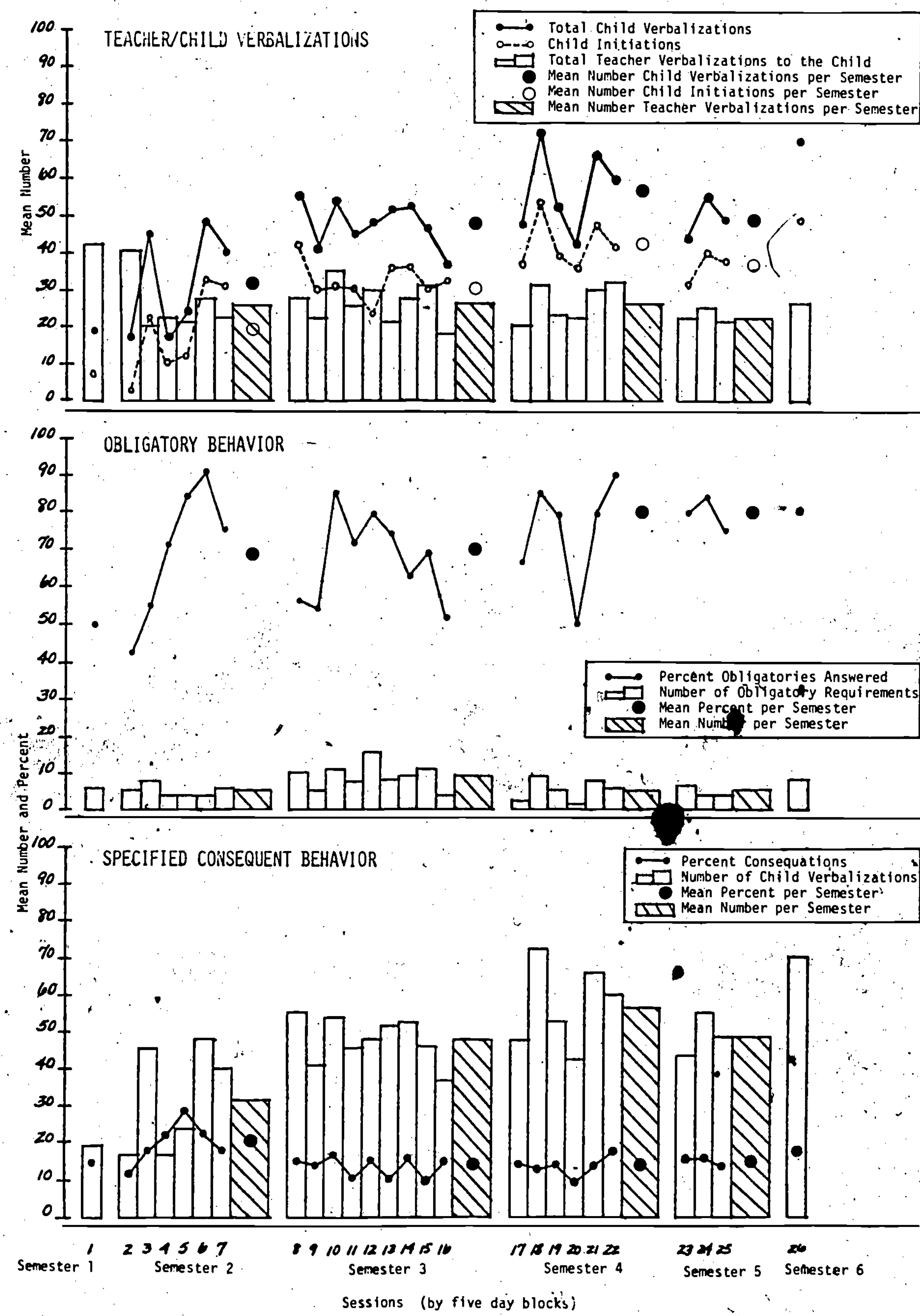



Figure 112

Subject: L.C.

Site: Lawrence

Figures 114 through 118

SUBJECT: LC SITE: LAWR

COMPLEXITY MEASURES

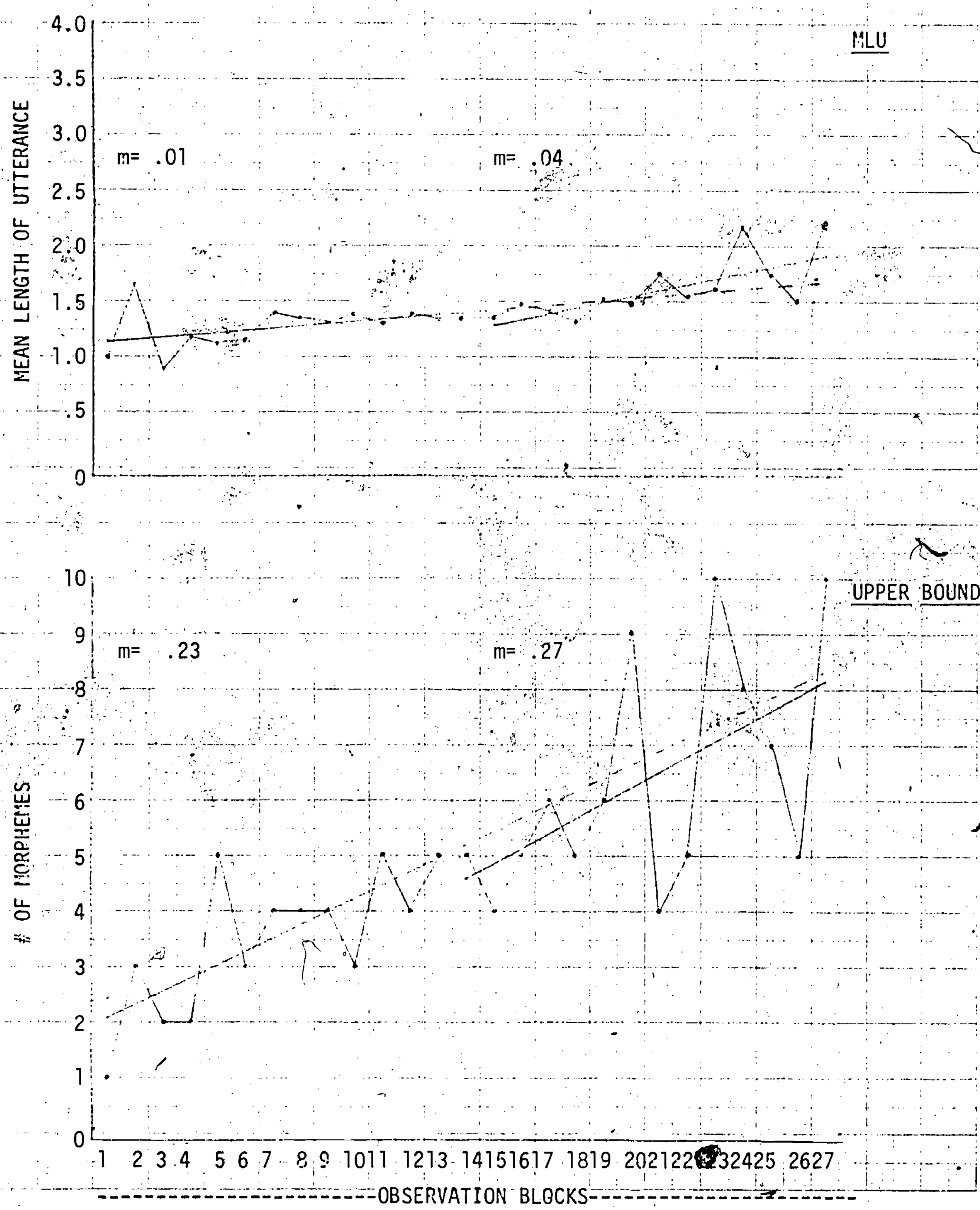



Figure 114

SUBJECT: LC SITE: LAWR

COMPLEXITY MEASURES

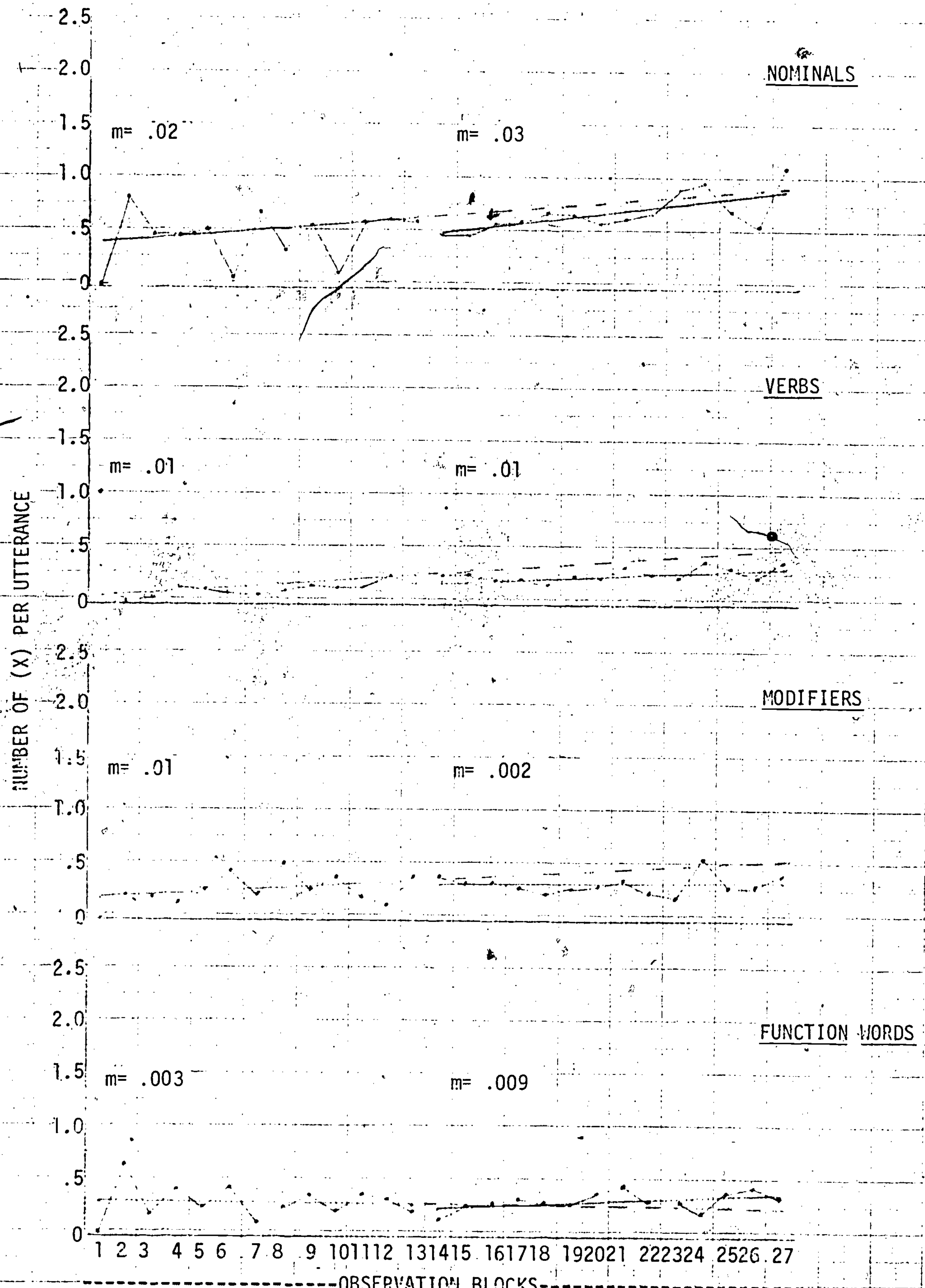



Figure 115

**SUBJECT: LC** **SITE: [illegible]WR**

## MAJOR CATEGORIES

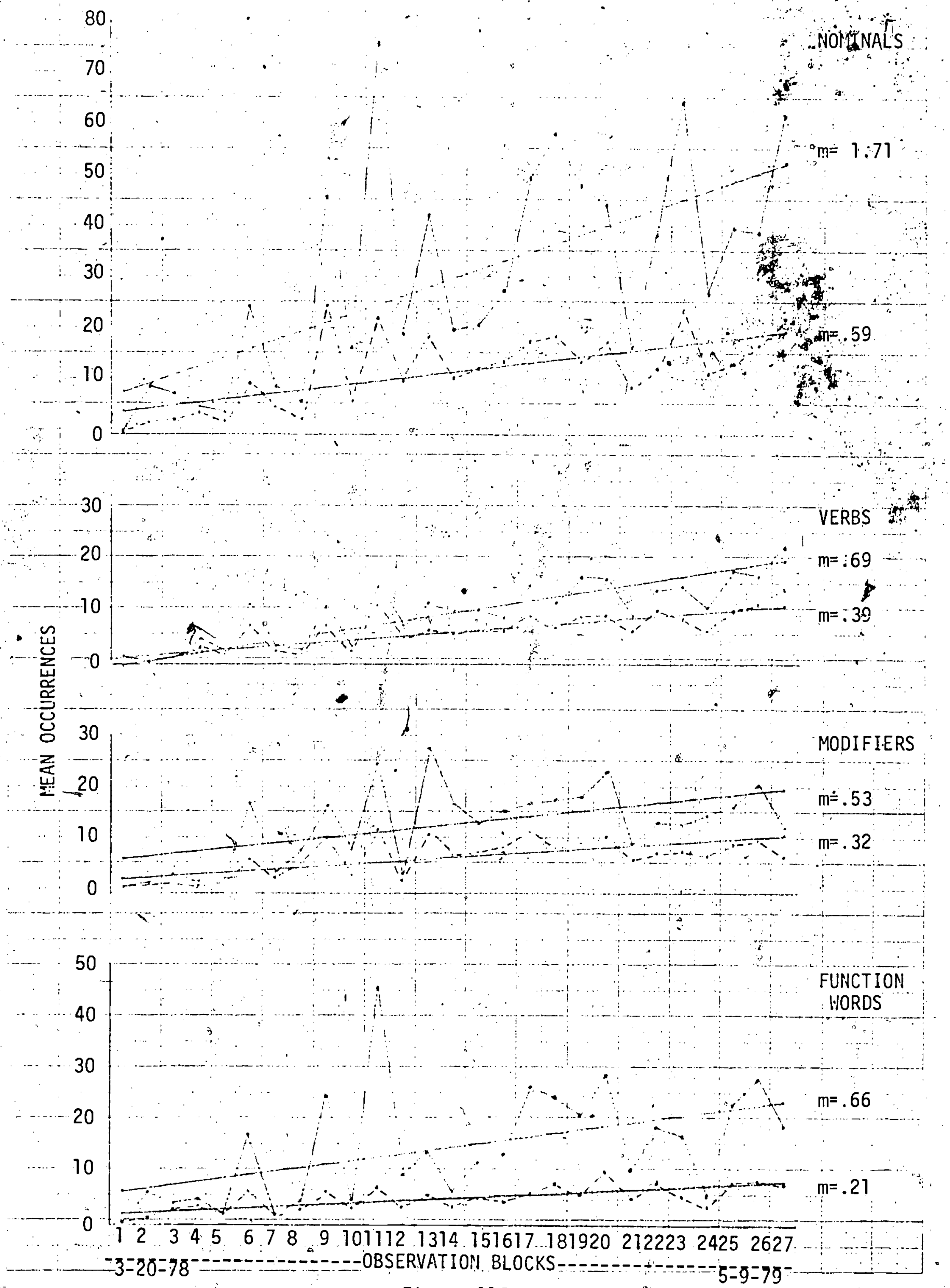



Figure 116

**SUBJECT: LC**
**SITE: LAWR**

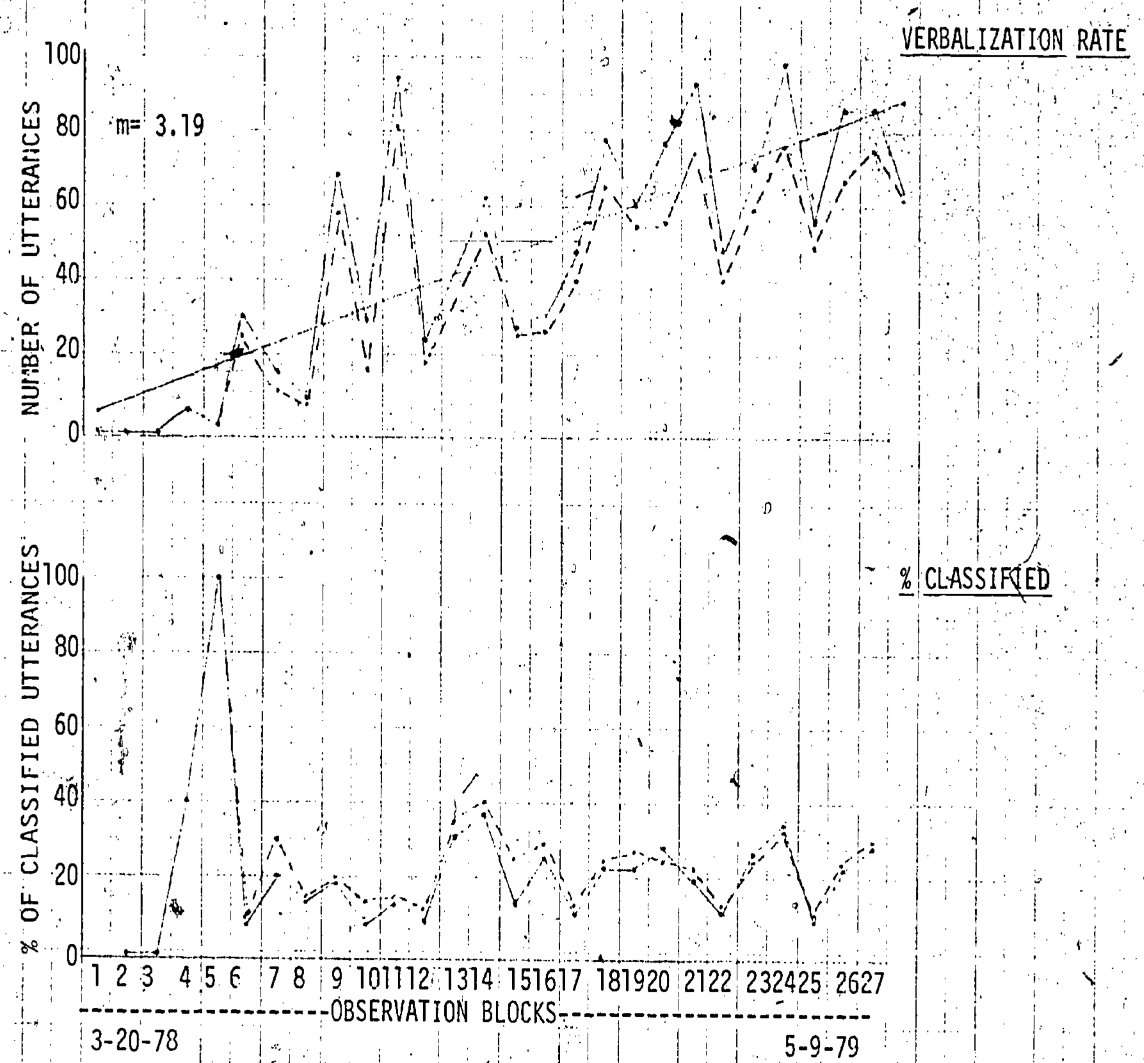



Figure 117

# VERBAL INTERACTION ANALYSIS

SUBJECT: LC SITE: LAWRENCE

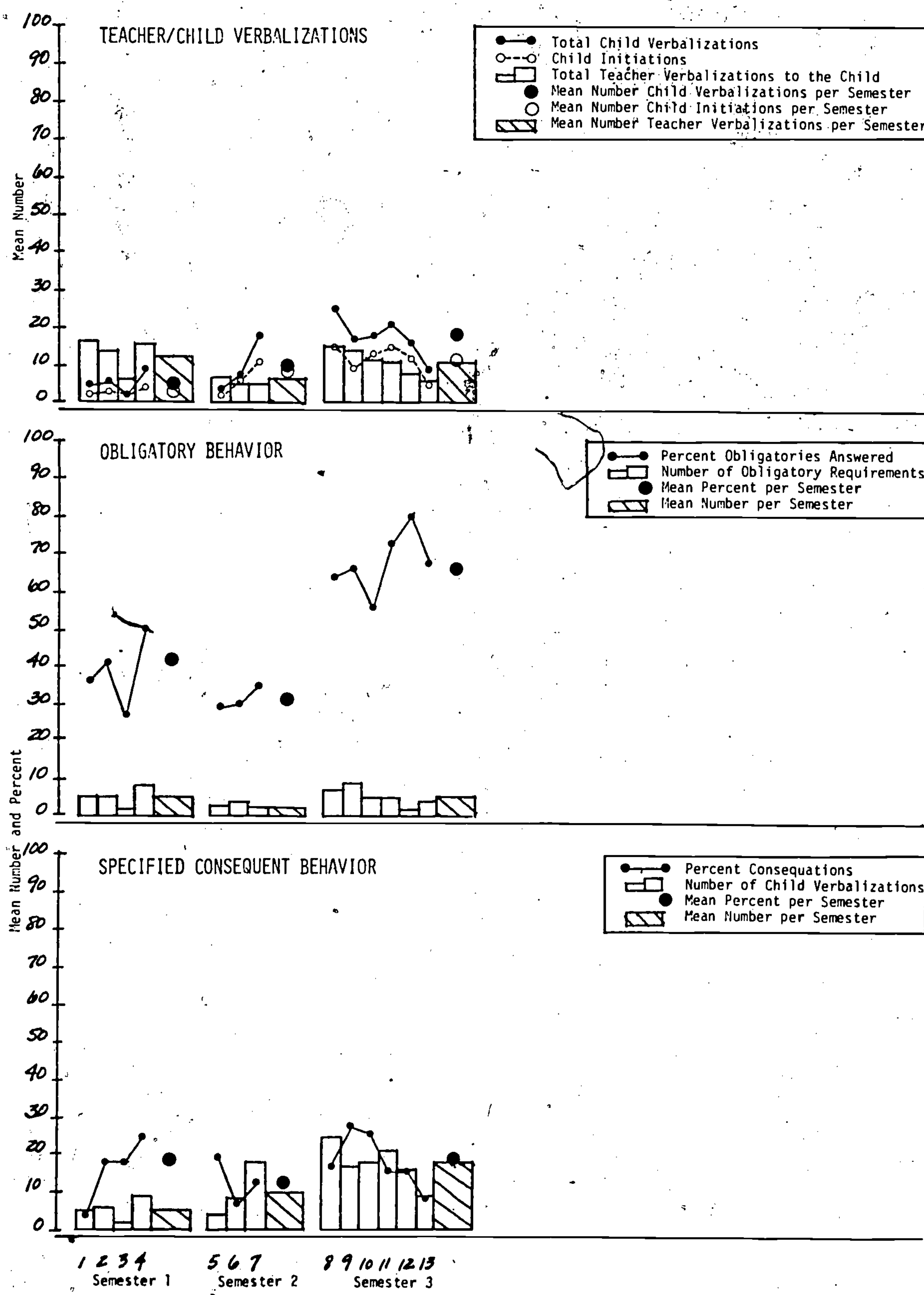



Figure 118

Parsons Data

Subject: R.B.

Site: Parsons

Figures 119 through 122

SUBJECT: RB SITE: PARSONS

# COLLAPSED FORMS

FORM: NOUN(PRO)- VERB -(PREP)-(MOD)- NOUN(PRO)

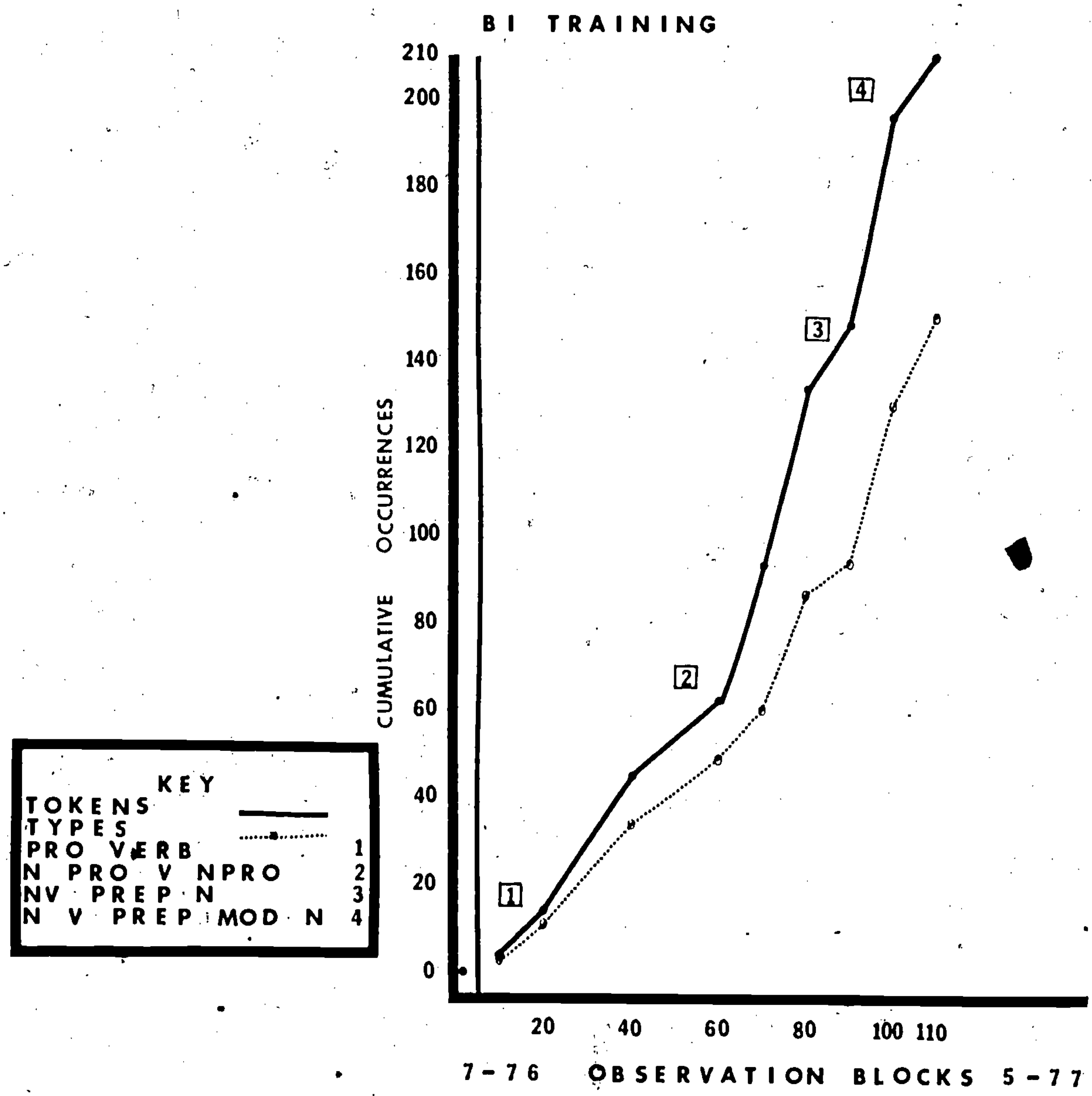



Figure 119

SUBJECT: RB SITE: PARSONS

# COLLAPSED FORMS

FORMS: VERB(PREP) NOUN(PRON) ADVERB

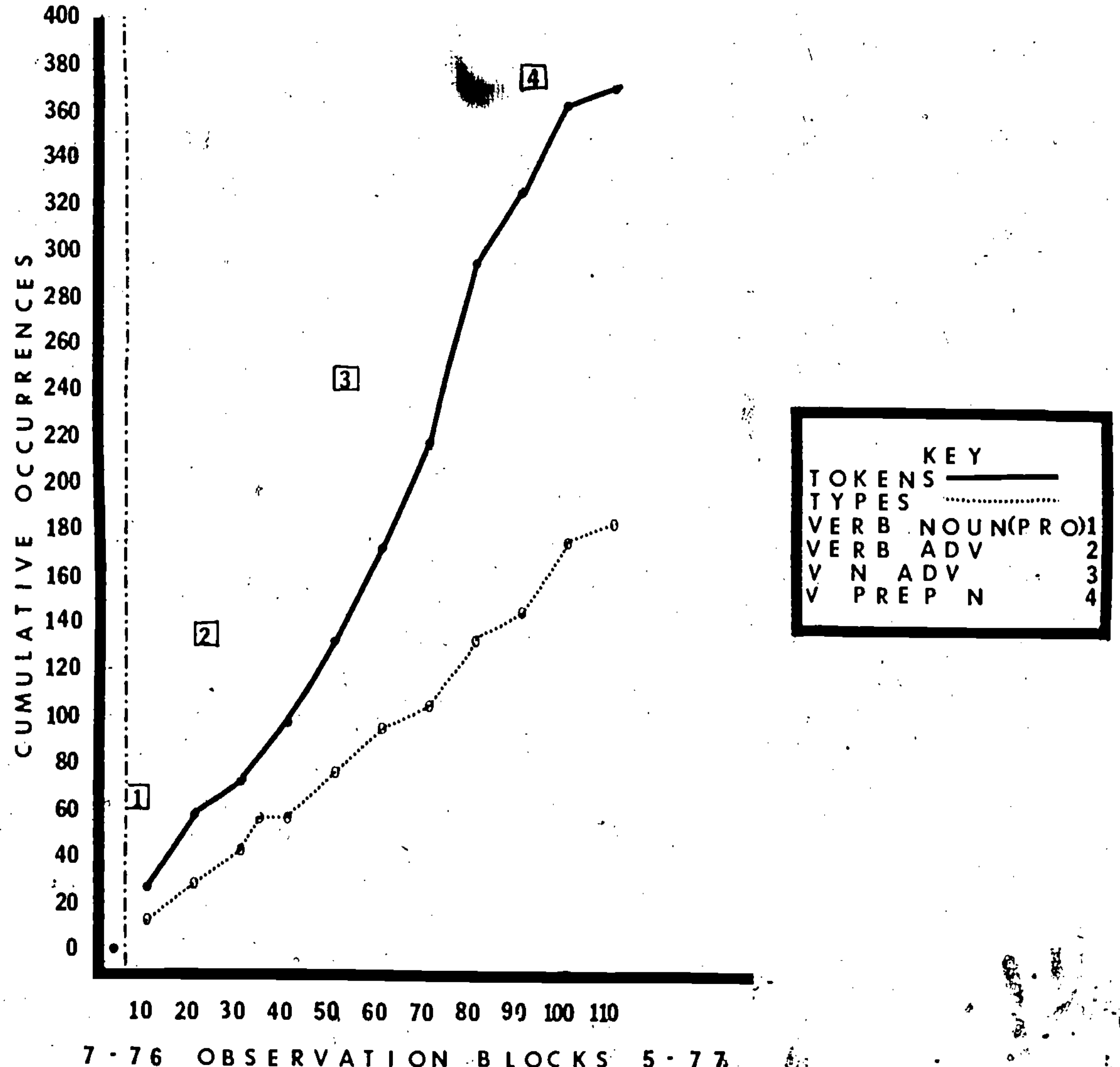



Figure 120

Subject R B          Site: Parsons

Vocabulary Acquisition

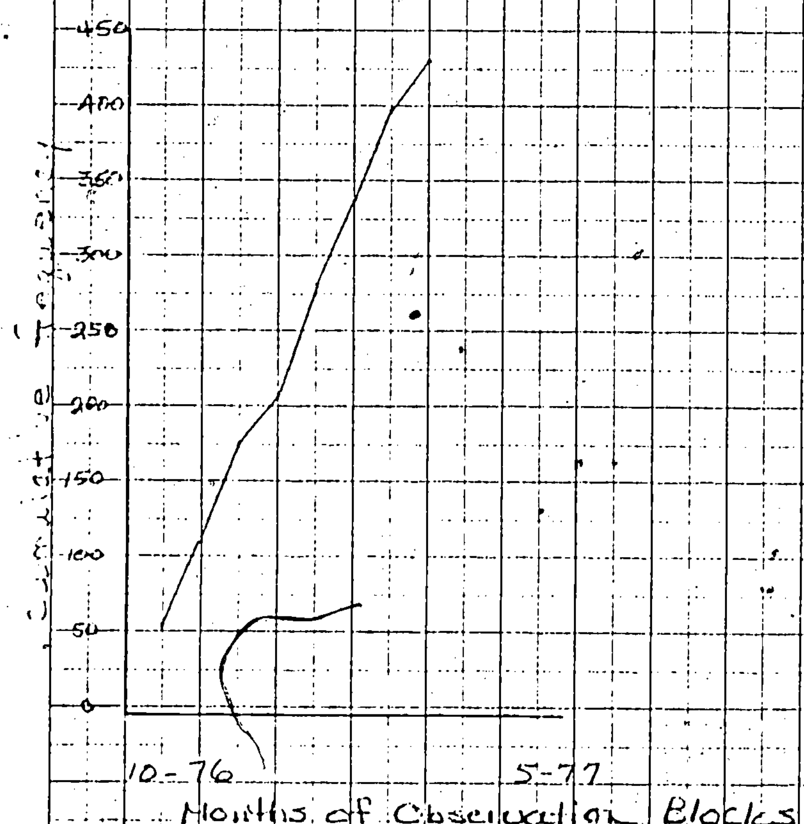



Figure 121

# LINGUISTIC COMPLEXITY ANALYSIS

Name: R.B. Number of Utterances: 50/20 samples

| | | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Setting | Date | Sessions | MLU | MLU (Ex) | L. Utterance | Nominals | Verbs | TTR |
| Freeplay | 10-5-76 | 2 | 2.00 | | 4 | .64 | .50 | .27 |
| " | 3-18-77 | 2 | 2.24 | | 4 | .90 | .68 | .22 |
| " | 5-9-77 | 3 | 2.60 | | 5 | 1.26 | .56 | .25 |
| Academic | 11-12-76 | 2 | 1.90 | | 4 | .86 | .32 | .28 |
| " | 3-17-77 | 2 | 1.52 | | 5 | .56 | .42 | .19 |
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Figure 122

Subject: T.B.

Site: Parsons

Figures 123 through 124

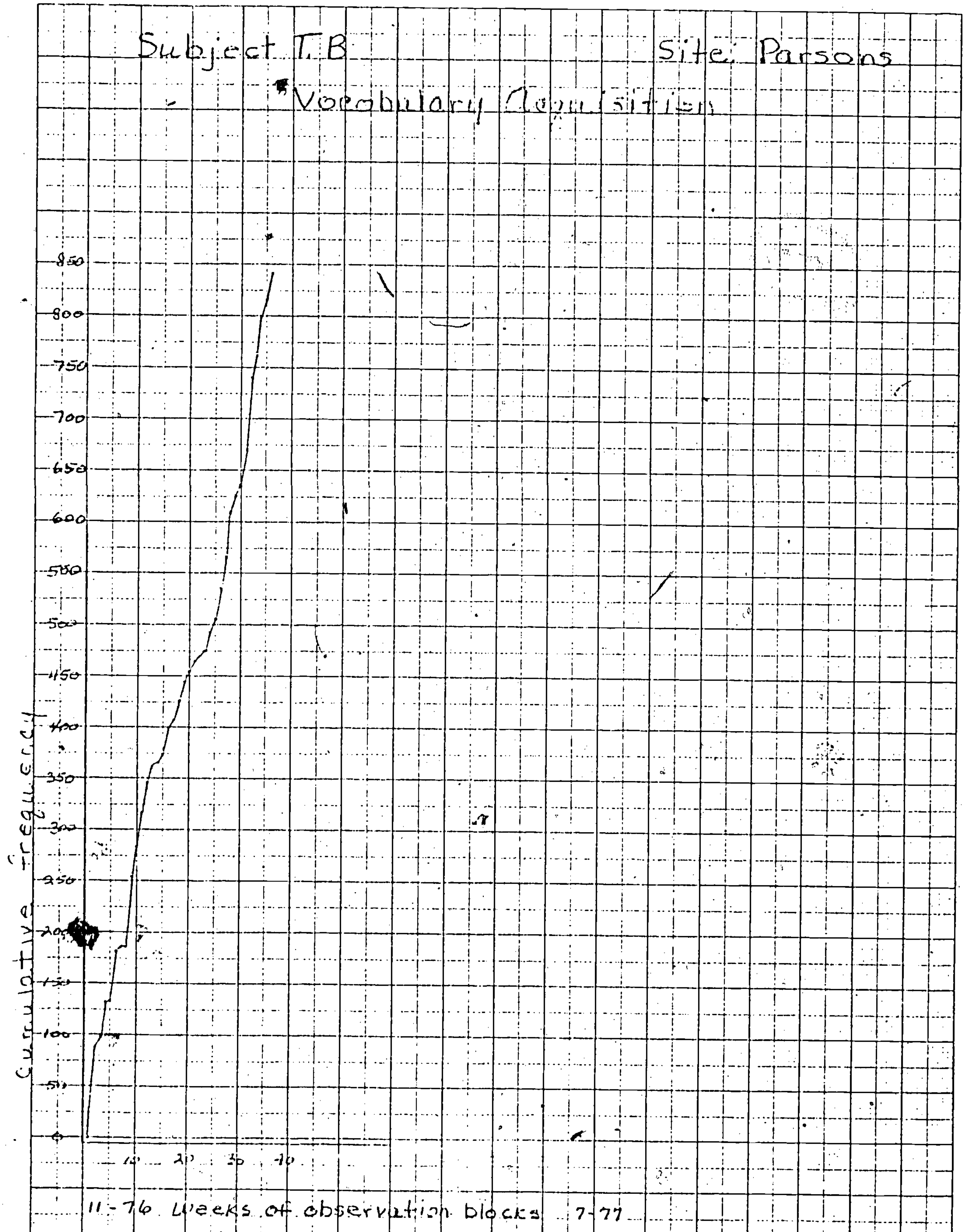
Subject T.B
Site: Parsons
Vocabulary Acquisition
Cumulative frequency
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
10
20
30
40
11-76 Weeks of observation blocks 7-77

Figure 123

LINGUISTIC COMPLEXITY ANALYSIS

Name: T.B.  Number of Utterances: 100/20 samples

| | | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Setting | Date | Sessions | MLU | MLU (Ex) | L. Utterance | Nominals | Verbs | TTR |
| Academic | 11-16-76 | 3 | 2.68 | | 5 | 106 | .57 | .15 |
| " | 2-25-77 | 2 | 2.31 | | 6 | 97 | .38 | .25 |
| " | 4-18-77 | 3 | 2.29 | | 6 | 106 | .47 | .13 |
| " | 5-24-77 | 2 | 2.80 | | 5 | 142 | .73 | .15 |
| " | 7-1-77 | 2 | 3.10 | | 5 | 147 | .87 | .1 |
| Freeplay | 12-1-76 | 3 | 2.67 | | 7 | 103 | .59 | .15 |
| " | 3-8-77 | 3 | 2.09 | | 8 | 100 | .45 | .21 |
| " | 5-2-77 | 3 | 2.36 | | 6 | 200 | .82 | .24 |
| " | 5-18-77 | 2 | 2.28 | | 7 | 91 | .38 | .18 |
| " | 6-6-77 | 2 | 3.15 | | 6 | 164 | .95 | .17 |
| " | 6-17-77 | 2 | 2.77 | | 6 | 132 | .75 | .21 |
| " | 6-30-77 | 1 | 2.36 | | 6 | 109 | .48 | .15 |
| " | 7-14-77 | 1 | 3.13 | | 9 | 112 | .70 | .17 |
| Self-Help | 11-18-76 | 4 | 2.60 | | 10 | 106 | .58 | .27 |
| " | 6-2-77 | 2 | 2.83 | | 6 | 126 | .64 | .14 |
| " | 6-20-77 | 2 | 3.29 | | 6 | 151 | .88 | .13 |
| " | 7-11-77 | 2 | 3.44 | | 8 | 116 | .64 | .10 |
| | | | | | | | | |
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Figure 124

Subject: C.R.

Site: Parsons

Figures 125 through 128

Figure 125

SUBJECT: CR(VOCAL) SITE: PARSONS

COLLAPSED FORMS

FORM: (PRON) NOUN VERB NOUN (PRON)

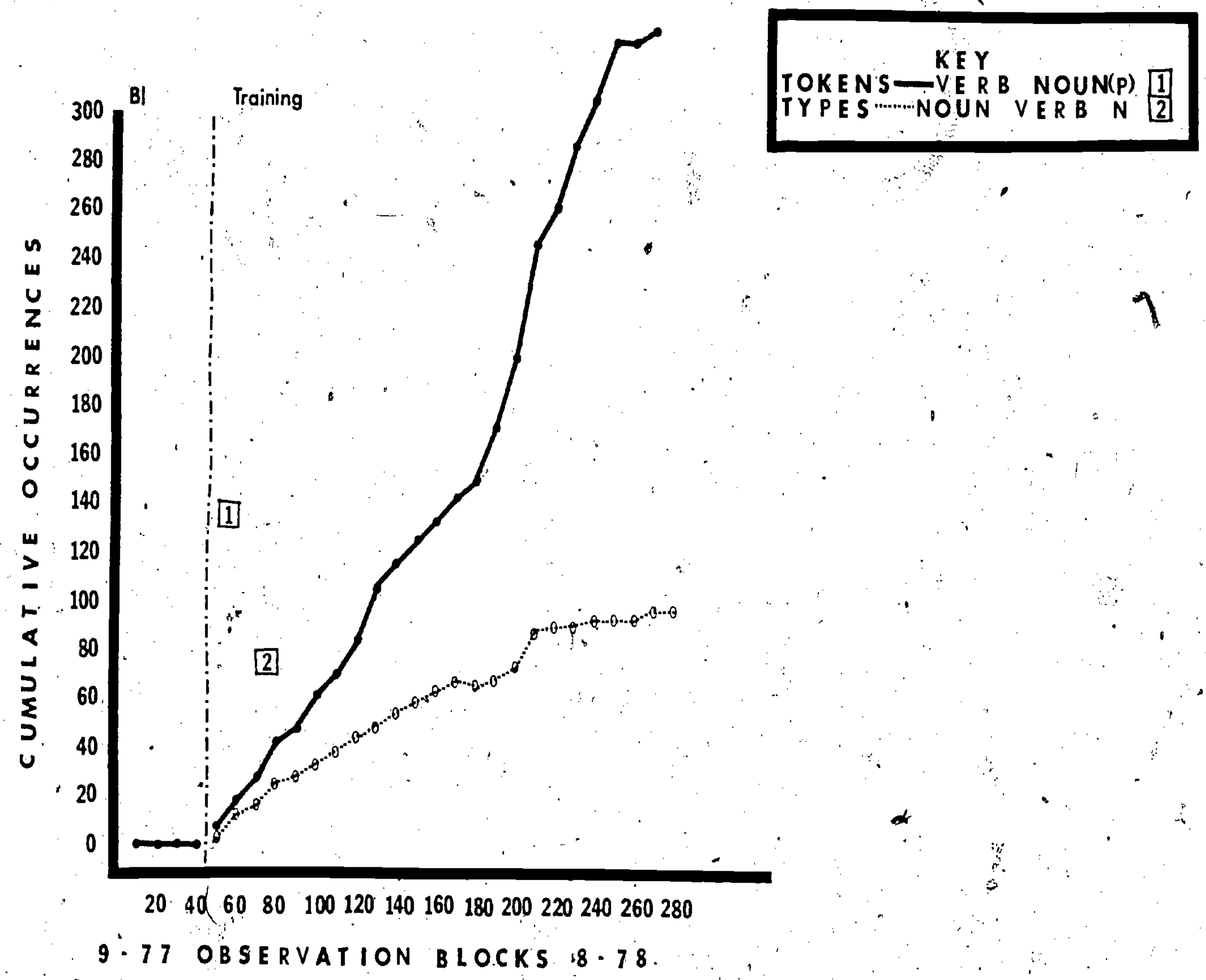


Figure 126

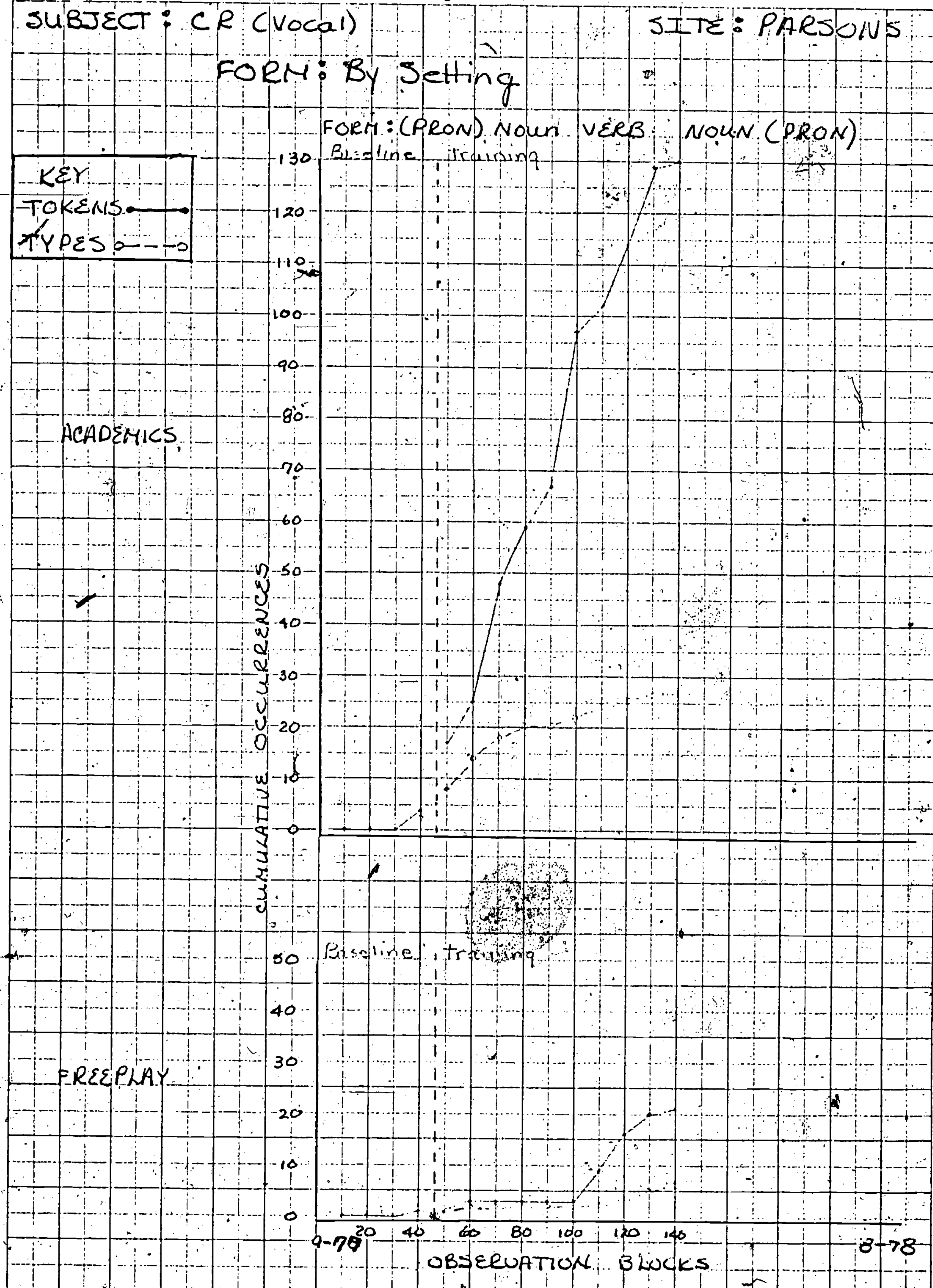

SUBJECT: CR (Vocal)
SITE: PARSONS
FORM: By Setting
FORM: (PRON) NOUN VERB NOUN (PRON)
KEY
TOKENS
TYPES
ACADEMICS
FREEPLAY
Baseline
training
CUMULATIVE OCCURRENCES
130
120
110
100
90
80
70
60
50
40
30
20
10
0
OBSERVATION BLOCKS
20
40
60
80
100
120
140
8-78

Figure 127

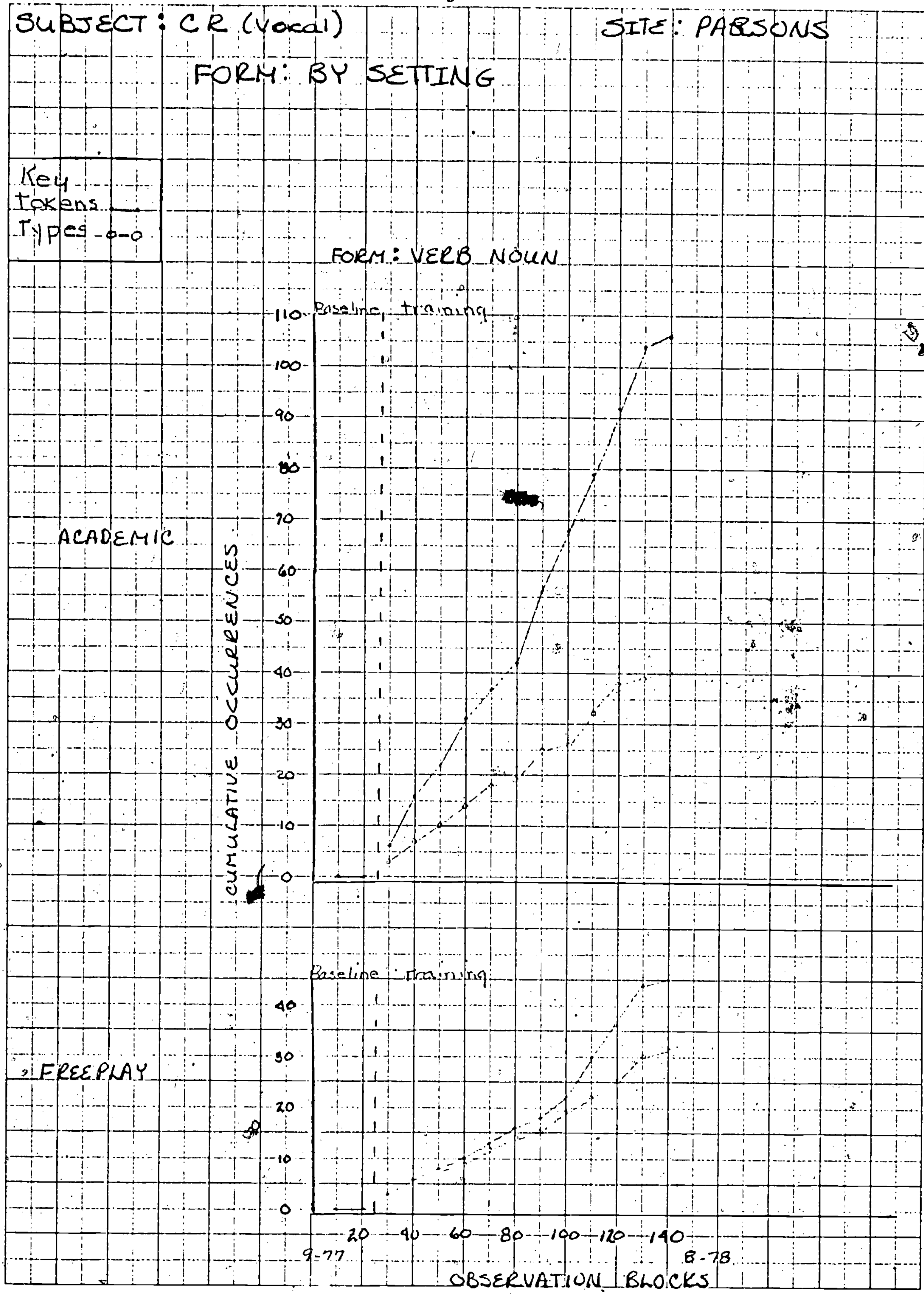
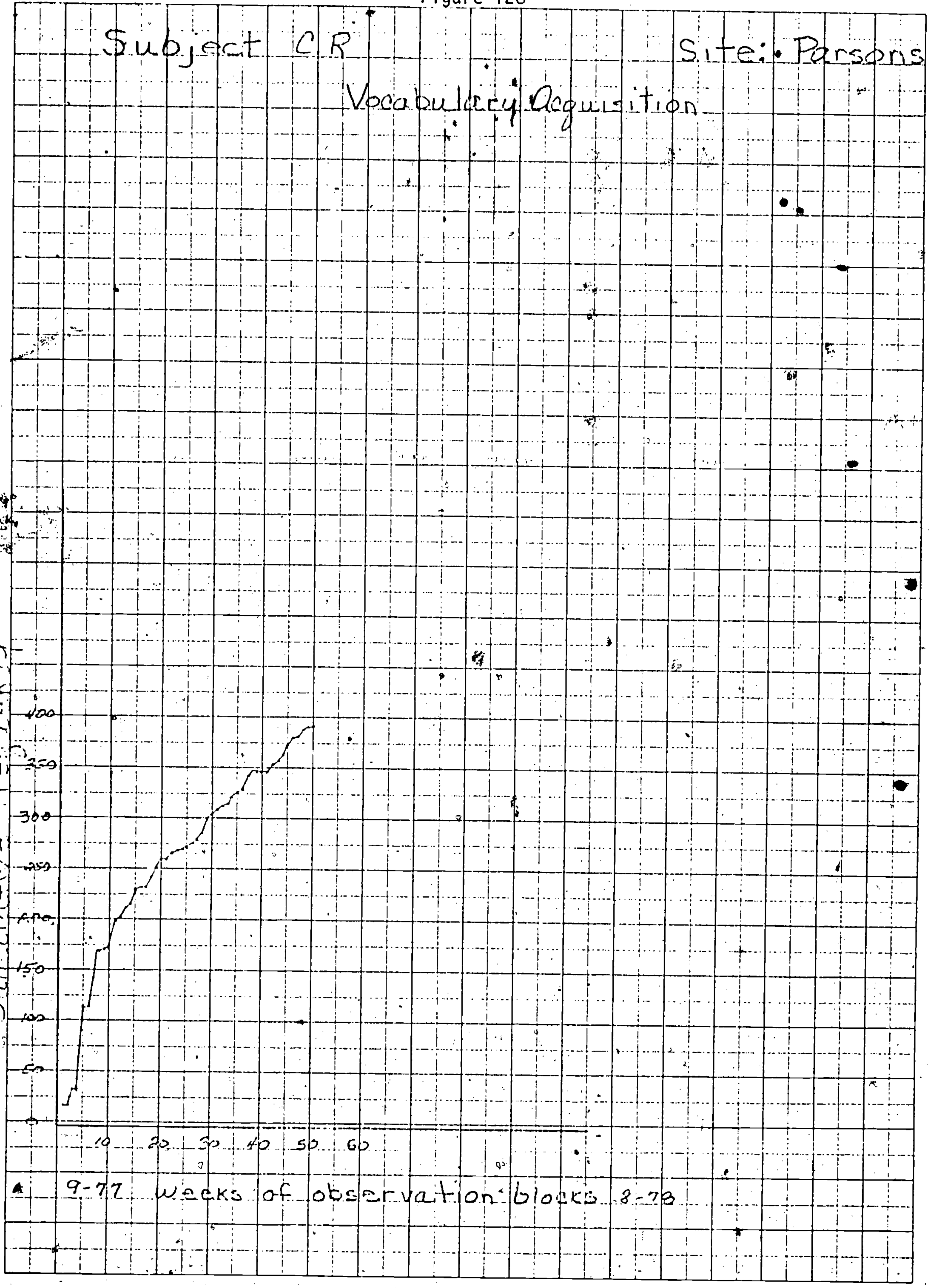

SUBJECT: CR (Vocal)
SITE: PARSONS
FORM: BY SETTING
Key
Tokens
Types
FORM: VERB NOUN
Baseline
training
ACADEMIC
CUMULATIVE OCCURRENCES
110
100
90
80
70
60
50
40
30
20
10
0
FREEPLAY
40
30
20
10
0
20
40
60
80
100
120
140
9-77
8-78
OBSERVATION BLOCKS

Figure 128



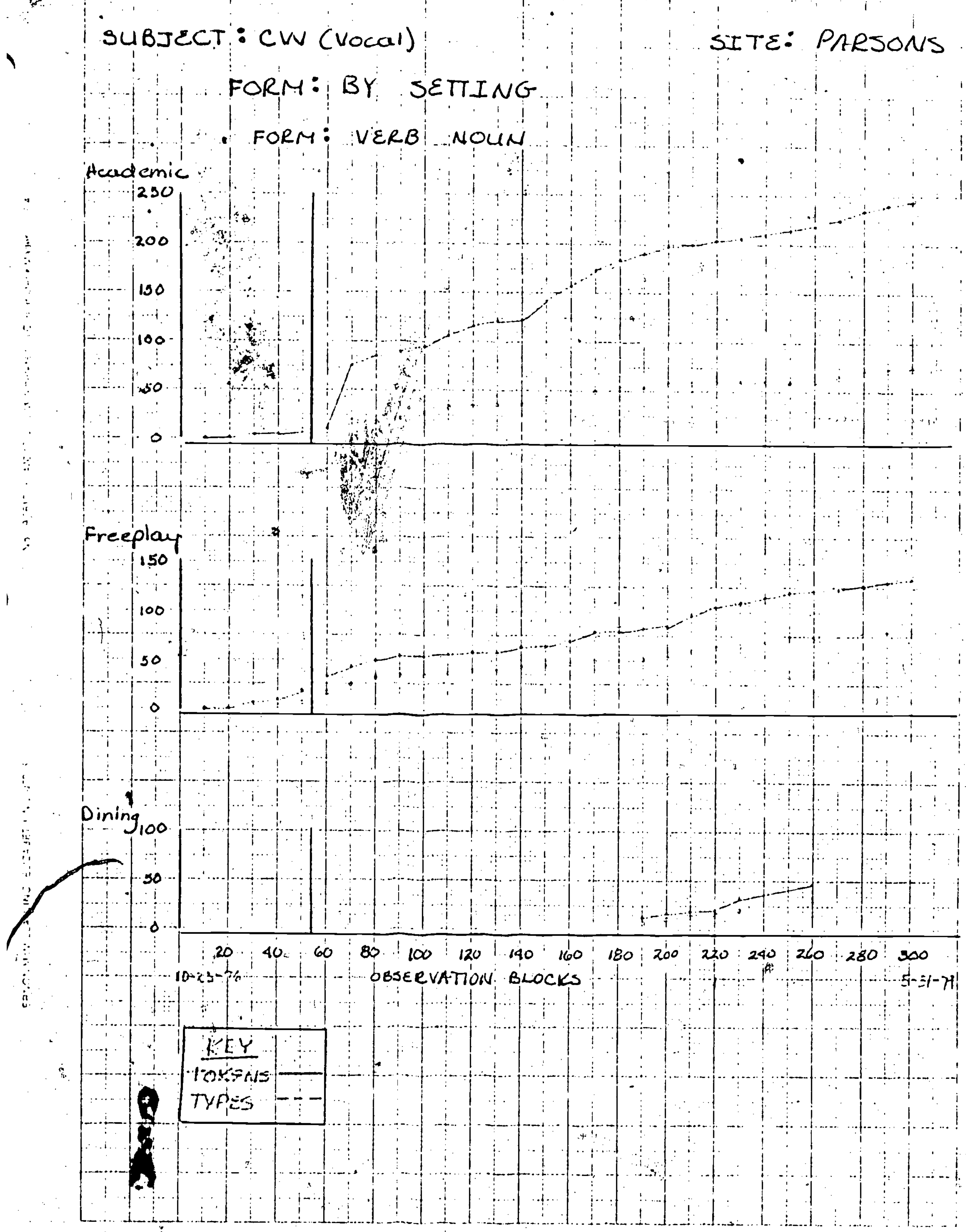
Subject C.R.
Site: Parsons
Vocabulary Acquisition
Cumulative Frequency
400
350
300
250
200
150
100
50
10
20
30
40
50
60
9-77 weeks of observation blocks 8-78

Subject: C.W.

Site: Parsons

Figures 129 through 132

Figure 129



SUBJECT: CW (Vocal)
SITE: PARSONS
FORM: BY SETTING
FORM: VERB NOUN
Academic
250
200
150
100
50
0
Freeplay
150
100
50
0
Dining
100
50
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
10-25-76
OBSERVATION BLOCKS
5-31-77
KEY
TOKENS
TYPES

Figure 130

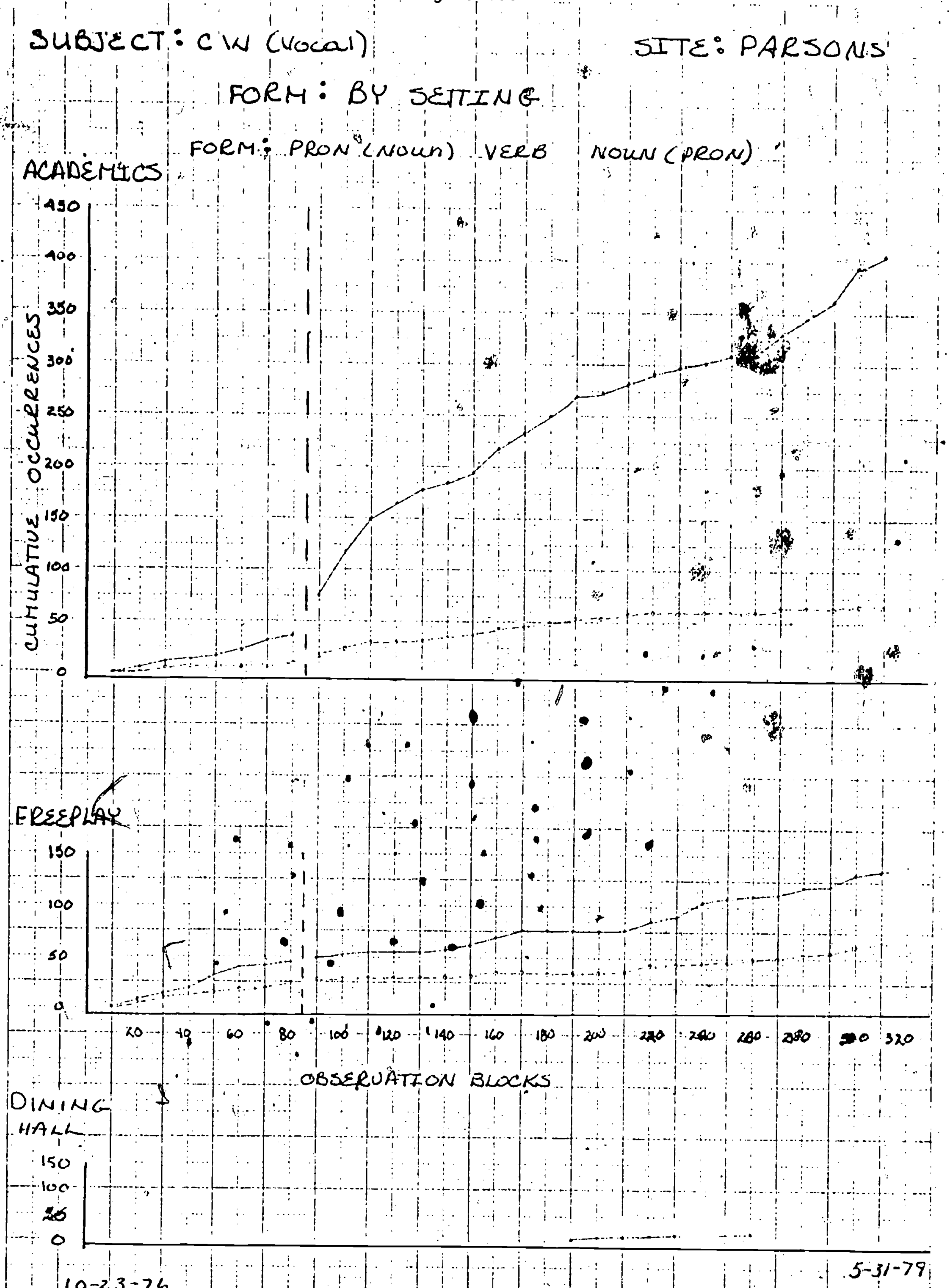
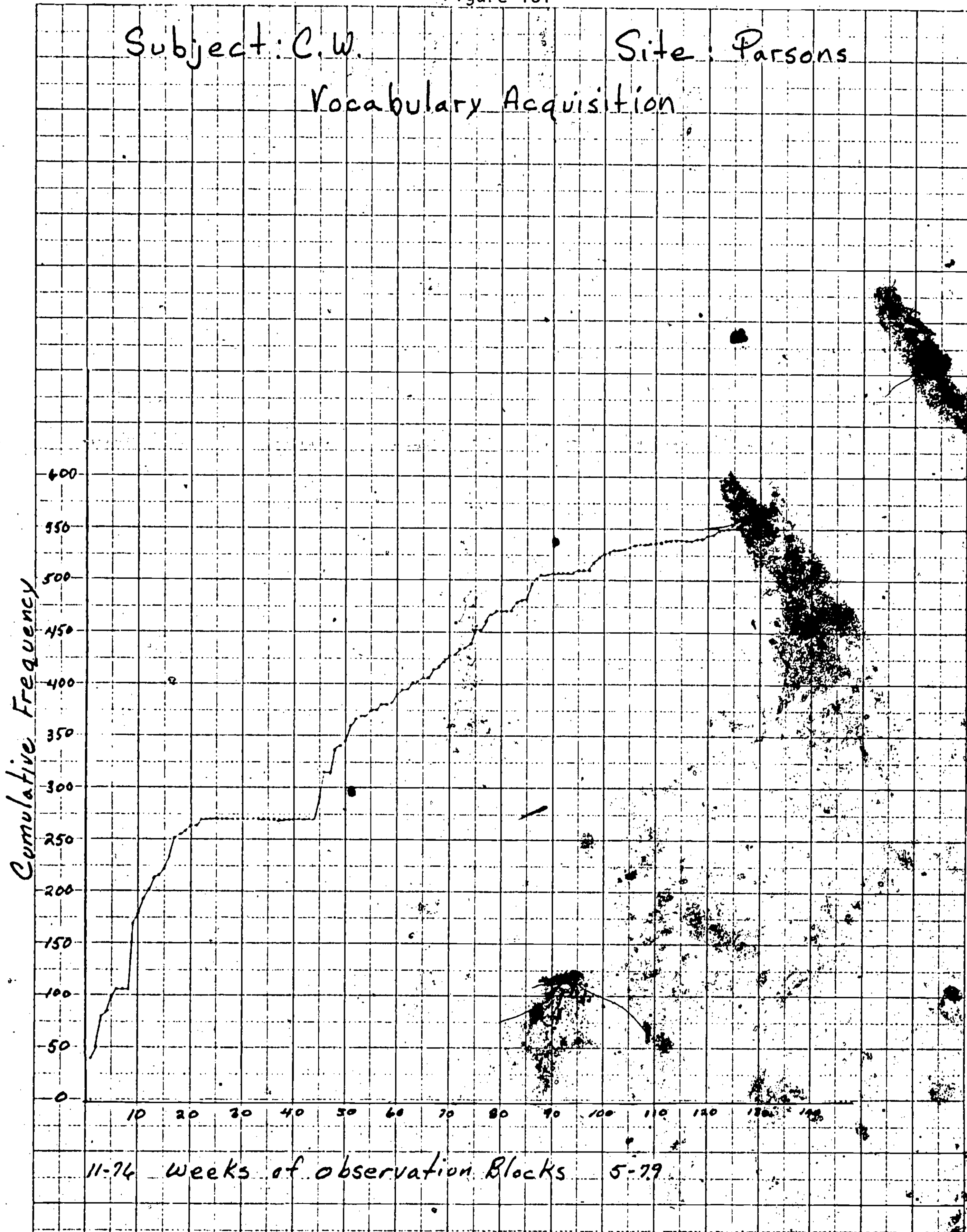

SUBJECT: CW (Vocal)
SITE: PARSONS
FORM: BY SETTING
FORM: PRON (NOUN) VERB NOUN (PRON)
ACADEMICS
CUMULATIVE OCCURRENCES
0
50
100
150
200
250
300
350
400
450
FREEPLAY
0
50
100
150
DINING HALL
0
150
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
OBSERVATION BLOCKS
10-23-76
5-31-79

Figure 131



Subject: C.W.
Site: Parsons
Vocabulary Acquisition
Cumulative Frequency
600
550
500
450
400
350
300
250
200
150
100
50
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
11-74 weeks of observation Blocks 5-79

Figure 132
LINGUISTIC COMPLEXITY ANALYSIS

Name: C.W. Number of Utterances: 100/40 samples

| | | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Setting | Date | Sessions | MLU | MLU (Ex) | L. Utterance | Nominals | Verbs | TTR |
| Lunch | 9-13-79 | 6 | 2.05 | | 6 | .83 | .59 | .25 |
| " | 11-6/78 | 7 | 2.22 | | 7 | .82 | .49 | .25 |
| Freeplay | 12-14-76 | 4 | 2.13 | | 5 | 1.04 | .23 | .25 |
| " | 6-1-77 | 5 | 2.26 | | 5 | 1.01 | .50 | .31 |
| " | 1-9-78 | 6 | 2.25 | | 6 | .76 | .28 | .25 |
| " | 4-26-78 | 4 | 2.84 | | 5 | .72 | .50 | .28 |
| " | 8-7-78 | 9 | 1.83 | | 7 | .80 | .53 | .34 |
| " | 11-22-78 | 6 | 2.14 | | 5 | .76 | .56 | .26 |
| " | 3-30-79 | 10 | 1.80 | | 5 | .77 | .42 | .21 |
| Academic | 11-23-76 | 5 | 1.62 | | 4 | .94 | .36 | .20 |
| " | 5-20-77 | 4 | 1.59 | | 4 | .65 | .44 | .32 |
| " | 1-9-78 | 2 | 1.33 | | 3 | .81 | .33 | .25 |
| " | 4-4-78 | 2 | 1.96 | | 5 | 1.03 | .38 | .22 |
| " | 7-14-78 | 2 | 1.66 | | 6 | .61 | [illegible]8 | .24 |
| " | 11-28-78 | 4 | 1.91 | | 5 | 1.09 | .43 | .21 |
| " | 4-2-79 | 9 | 2.15 | | 6 | 1.36 | .66 | .29 |
| | | | | | | | | |
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Subject: M.G.

Site: Parsons

Figures 133 through 137

Figure 133

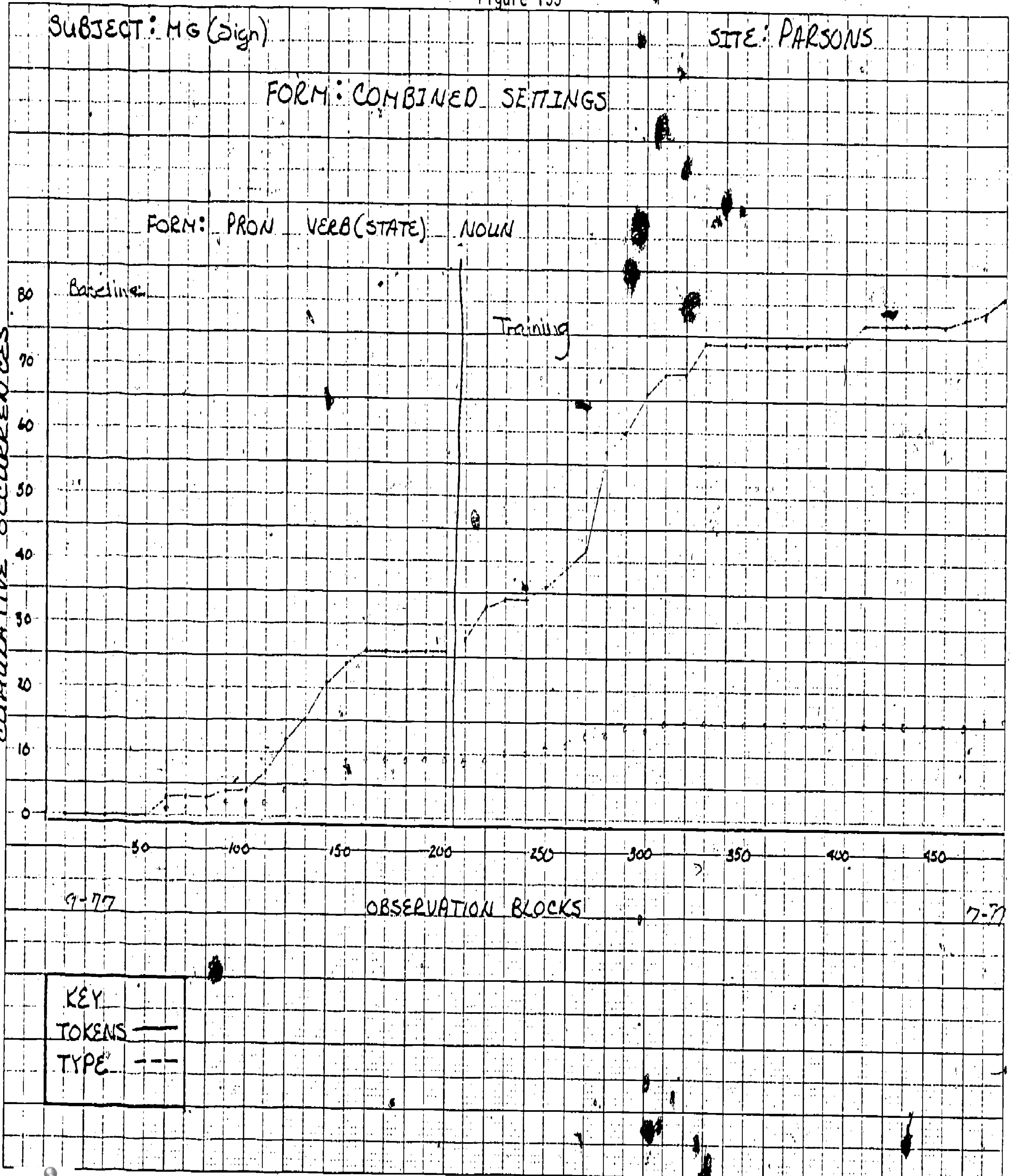

SUBJECT: MG (Sign)
SITE: PARSONS
FORM: COMBINED SETTINGS
FORM: PRON VERB (STATE) NOUN
Baseline
Training
CUMULATIVE OCCURRENCES
0
10
20
30
40
50
60
70
80
50
100
150
200
250
300
350
400
450
9-77
OBSERVATION BLOCKS
7-77
KEY
TOKENS ——
TYPE - - -

Figure 134

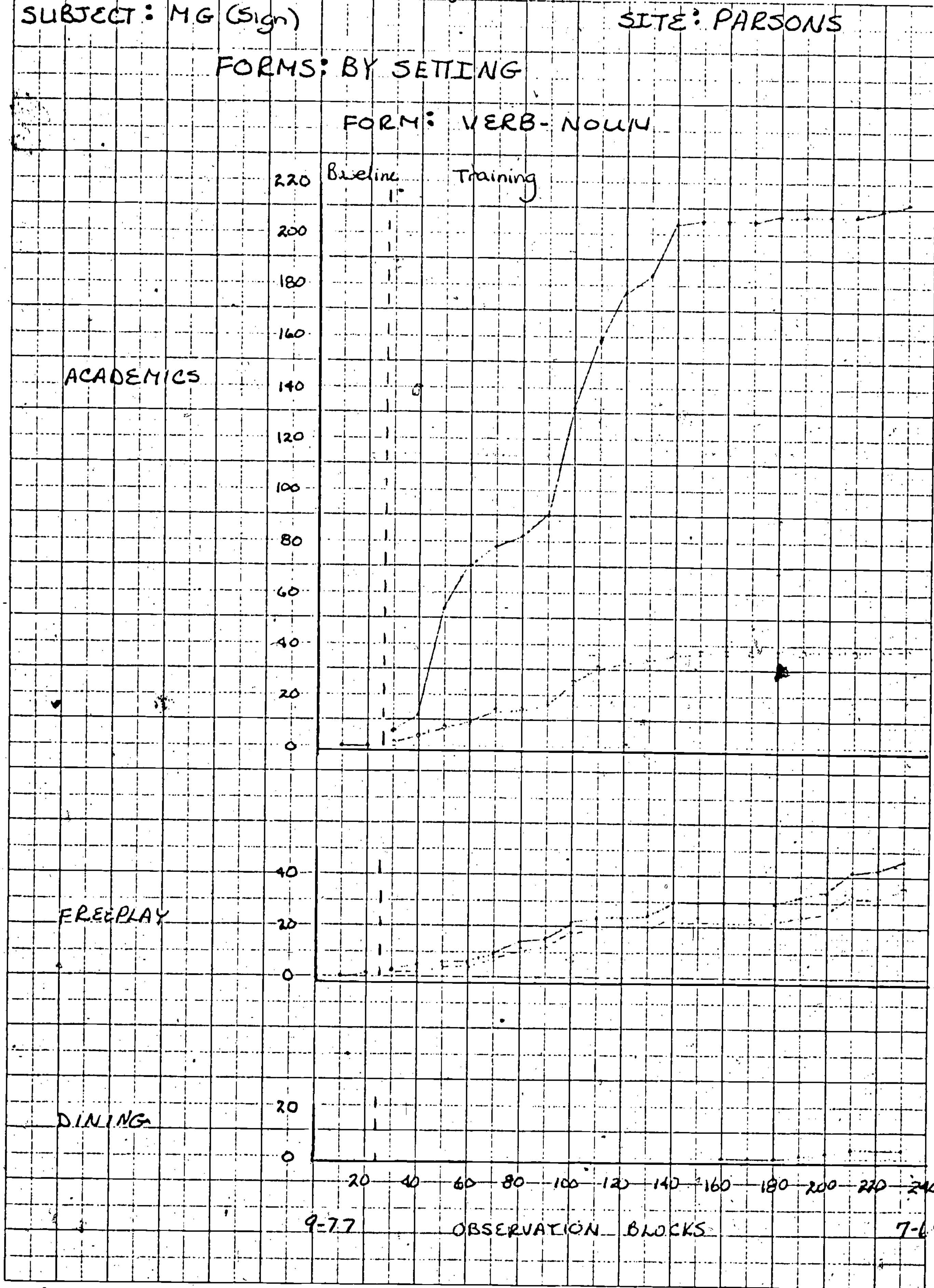
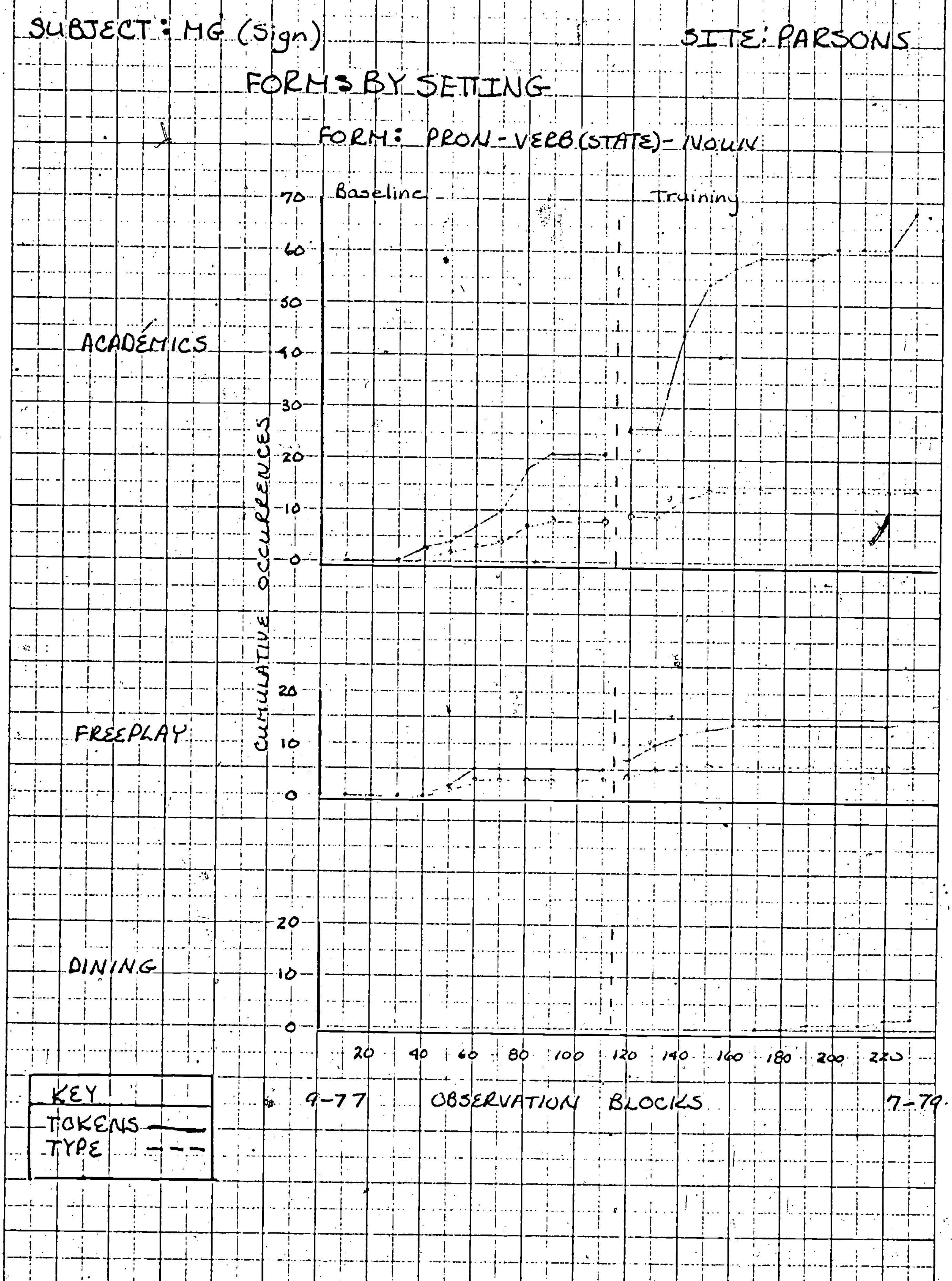
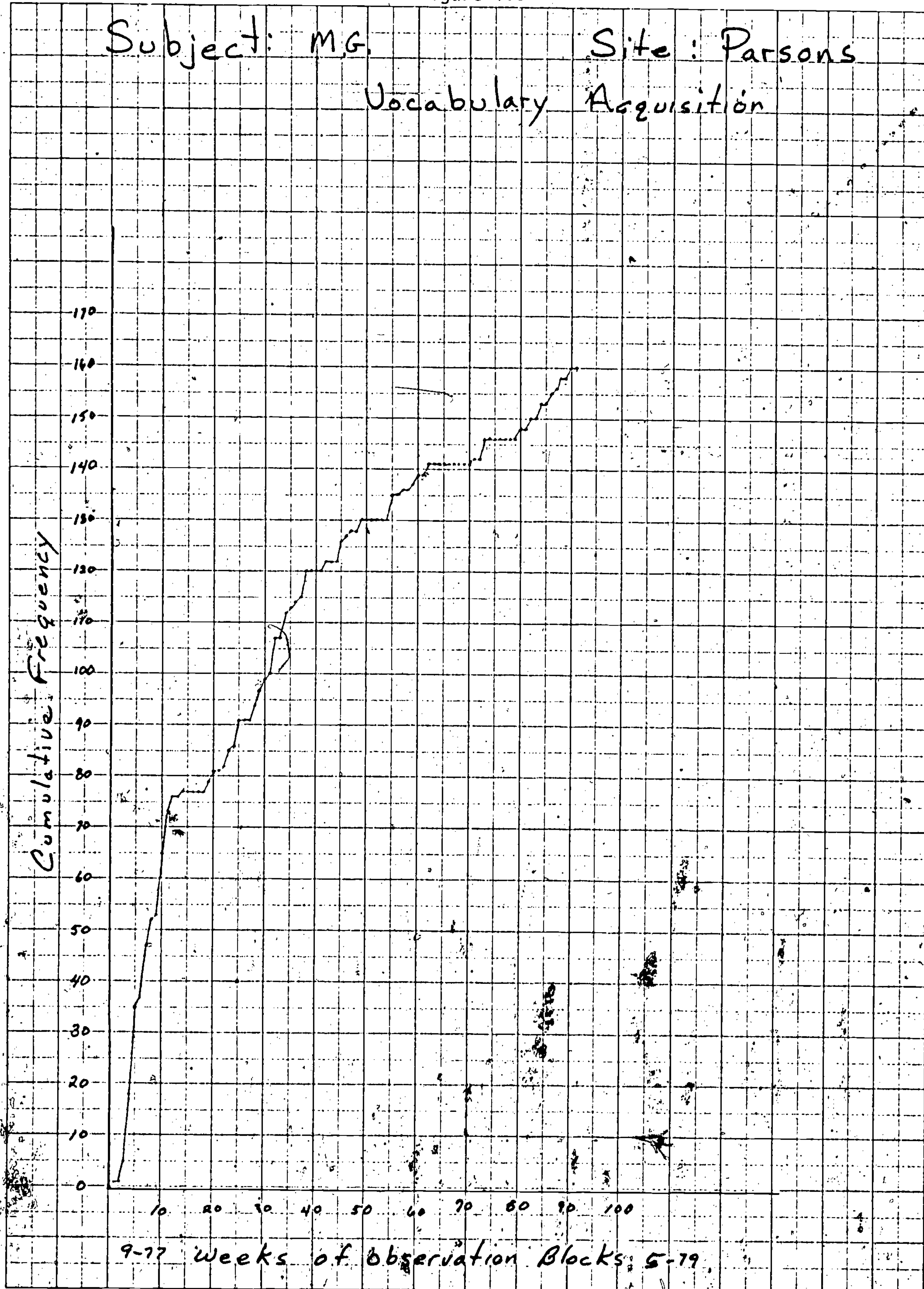

SUBJECT: MG (Sign)
SITE: PARSONS
FORMS: BY SETTING
FORM: VERB-NOUN
Baseline
Training
220
200
180
160
ACADEMICS
140
120
100
80
60
40
20
0
40
FREEPLAY
20
0
DINING
20
0
20
40
60
80
100
120
140
160
180
200
220
240
9-77
OBSERVATION BLOCKS
7-79

Figure 135



SUBJECT: MG (Sign)
SITE: PARSONS
FORMS BY SETTING
FORM: PRON-VERB(STATE)-NOUN
Baseline
Training
ACADEMICS
FREEPLAY
DINING
CUMULATIVE OCCURRENCES
70
60
50
40
30
20
10
0
20
10
0
20
10
0
20
40
60
80
100
120
140
160
180
200
220
9-77
OBSERVATION BLOCKS
7-79
KEY
TOKENS
TYPE

Figure 136




No R 2470 10-C 19 06(D) 10 mm. to a cm. - Made in U.S.A.

VERNON ROYAL INC. ELIZABETH, N.J. 07208

Figure 137

LINGUISTIC COMPLEXITY ANALYSIS

Name: *M.G.* Number of Utterances: 50/20 samples

| | | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Setting | Date | Sessions | MLU | MLU (Ex) | L. Utterance | Nominals | Verbs | TTR |
| Lunch | 9-19-79 | 11 | 1.08 | | 3 | .56 | .44 | .26 |
| " | 11-14-78 | 10 | 1.34 | | 2 | .68 | .44 | .13 |
| " | 3-1-79 | 7 | 1.32 | | 3 | .78 | .90 | .19 |
| " | 5-3-79 | 2 | 1.62 | | 3 | .90 | .54 | .18 |
| Freeplay | 9-26-77 | 10 | 1.10 | | 2 | .62 | .36 | .29 |
| " | 1-9-78 | 18 | 1.34 | | 3 | .68 | .58 | .17 |
| " | 5-2-78 | 14 | 1.06 | | 2 | .50 | .38 | .22 |
| " | 8-1-78 | 15 | 1.12 | | 3 | .66 | .34 | .28 |
| " | 10-25-78 | 43 | 1.32 | | 3 | .48 | .74 | .22 |
| " | 3-29-79 | 15 | 1.10 | | 2 | .60 | .32 | .29 |
| Academic | 9-22-77 | 9 | 1.04 | | 2 | .42 | .46 | .24 |
| " | 11-21-77 | 3 | 1.02 | | 2 | .6 | .32 | .22 |
| " | 2-9-78 | 2 | 1.18 | | 3 | .78 | .36 | .13 |
| " | 3-29-78 | 5 | 1.12 | | 3 | .7 | .68 | .12 |
| " | 5-17-78 | 3 | 1.14 | | 2 | .6 | .82 | .21 |
| " | 7-12-78 | 3 | 1.20 | | 3 | .78 | .32 | .14 |
| " | 10-25-78 | 13 | 1.44 | | 3 | .94 | .48 | .11 |
| " | 3-1-78 | 9 | 1.00 | | 1 | .90 | .08 | .13 |
| " | 4-11-79 | 18 | 1.04 | | 2 | .66 | .28 | .13 |
| Breakfast | 3-28-79 | 31 | 1.16 | | 3 | .56 | .26 | .22 |
| | | | | | | | | |
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Subject: J.R.

Site: Parsons

Figures 138 through 139

Figure 138

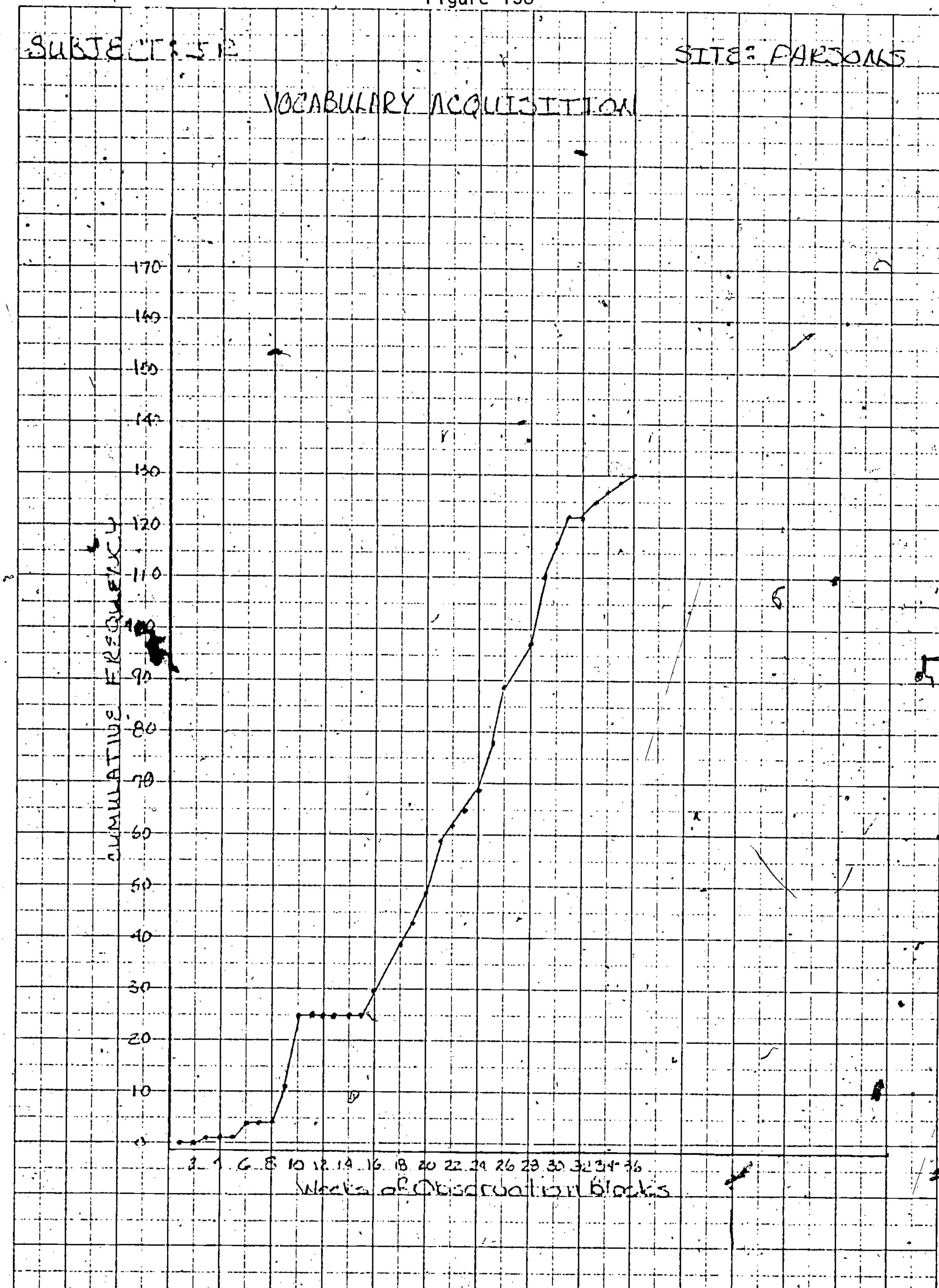
SUBJECT: 5F
SITE: PARSONS
VOCABULARY ACQUISITION
CUMULATIVE FREQUENCY
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
Weeks of Observation blocks

Figure 139

LINGUISTIC COMPLEXITY ANALYSIS

Name: J. R. Number of Utterances: 25/10 samples

| | | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Setting | Date | Sessions | MLU | MLU (Ex) | L. Utterance | Nominals | Verbs | TTR |
| Academic | 10-16-78 | 10 | 1.00 | | 1 | .84 | .08 | .30 |
| " | 3-13-79 | 2 | 1.28 | | 3 | .64 | .36 | .29 |
| " | 3-30-79 | 8 | 1.68 | | 4 | 1.32 | 0 | .14 |
| " | 5-3-79 | 3 | 1.88 | | 3 | 1.44 | 0 | .10 |
| X " | 5-23-79 | 5 | 1.08 | | 3 | .96 | 0 | .14 |
| Lunch | 11-21-78 | 9 | 1.08 | | 3 | .08 | .12 | .12 |
| " | 2-12-79 | 5 | 2.04 | | 5 | .96 | .56 | .18 |
| " | 3-8-79 | 6 | 1.64 | | 4 | .42 | .68 | .18 |
| " | 4-4-79 | 3 | 1.88 | | 3 | .42 | .84 | .27 |
| " | 5-3-79 | 2 | 1.68 | | 2 | .92 | .80 | .20 |
| " | 5-22-79 | 2 | 2.36 | | 3 | 1.4 | .80 | .16 |
| Freeplay | 10-20-78 | 17 | 1.24 | | 3 | .68 | .16 | .29 |
| " | 3-1-79 | 18 | 1.20 | | 3 | .44 | .52 | .35 |
| " | 4-24-79 | 7 | 1.16 | | 2 | .64 | .28 | .39 |
| | | | | | | | | |
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| | | | | | | | | |

Subject: W.P.

Site: Parsons

Figures 140 through 145

Figure 140

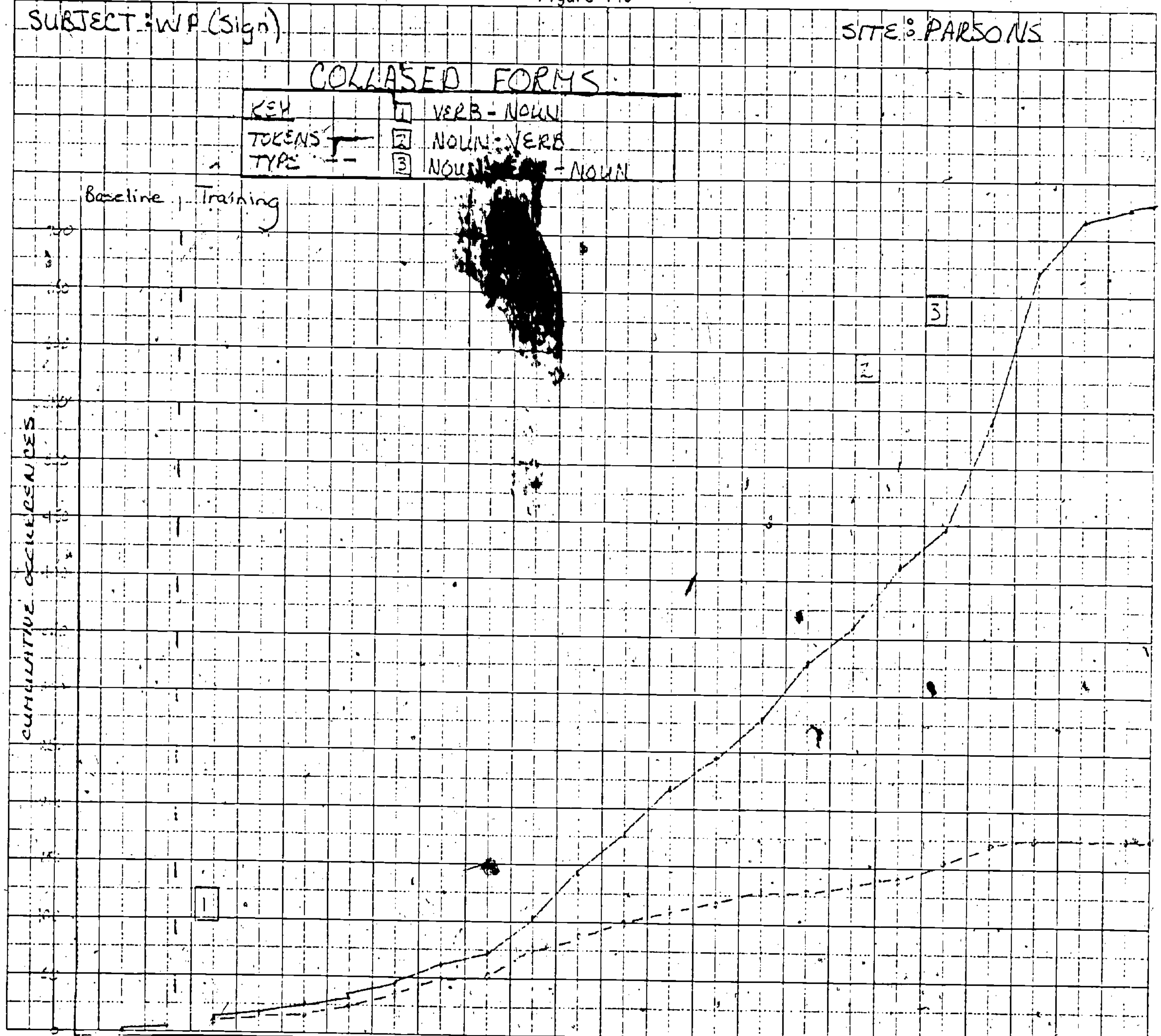
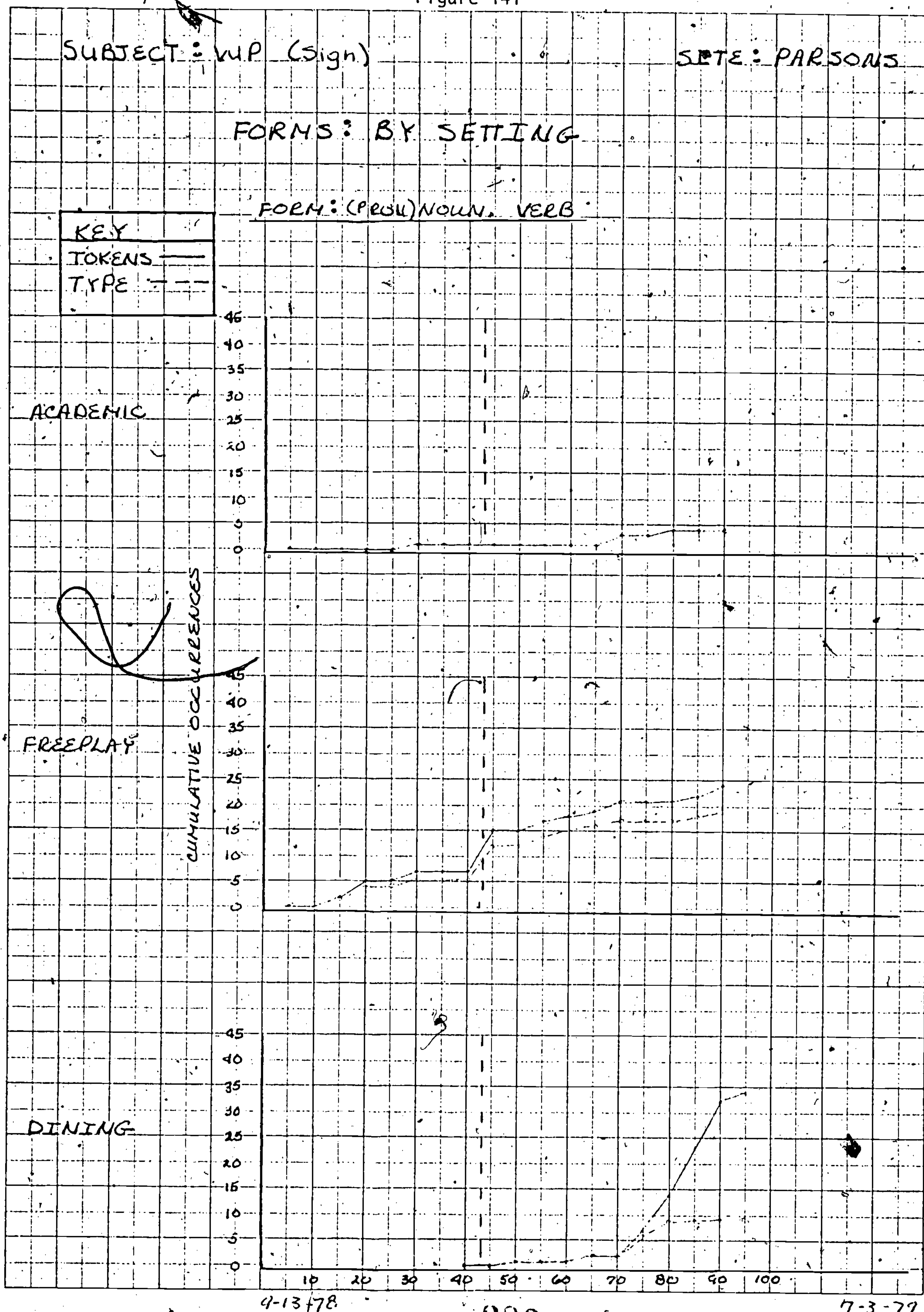

SUBJECT: WP (Sign)
SITE: PARSONS
COLLASED FORMS
KEY
TOKENS
TYPE
1 VERB - NOUN
2 NOUN - VERB
3 NOUN - NOUN
Baseline
Training
CUMULATIVE OCCURRENCES
1
2
3

Figure 141



SUBJECT: WP (Sign)
SITE: PARSONS
FORMS: BY SETTING
FORM: (PRON) NOUN, VERB
KEY
TOKENS
TYPE
ACADEMIC
FREEPLAY
DINING
CUMULATIVE OCCURRENCES
0
5
10
15
20
25
30
35
40
45
10
20
30
40
50
60
70
80
90
100
4-13-78
7-3-77

Figure 142

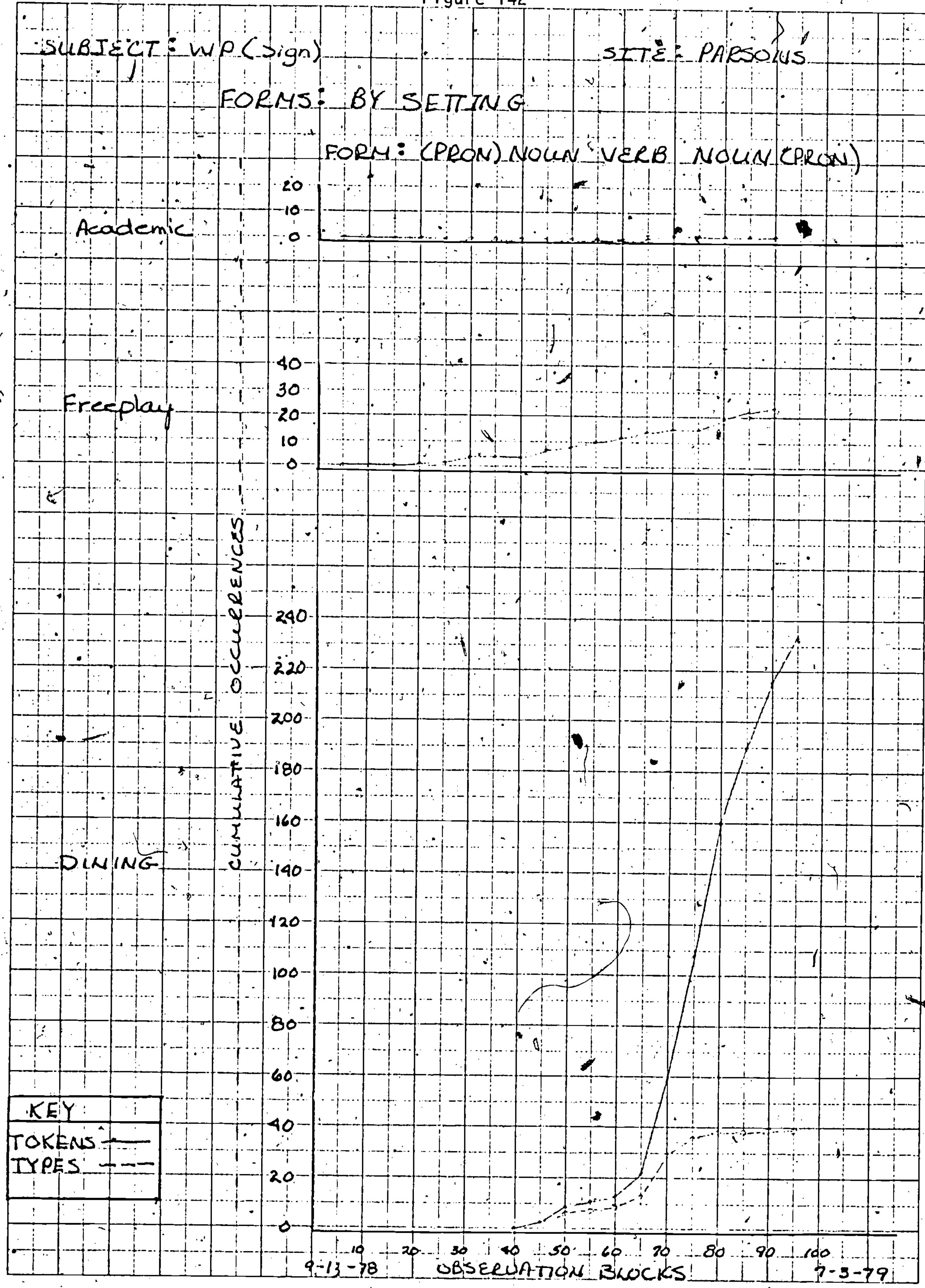
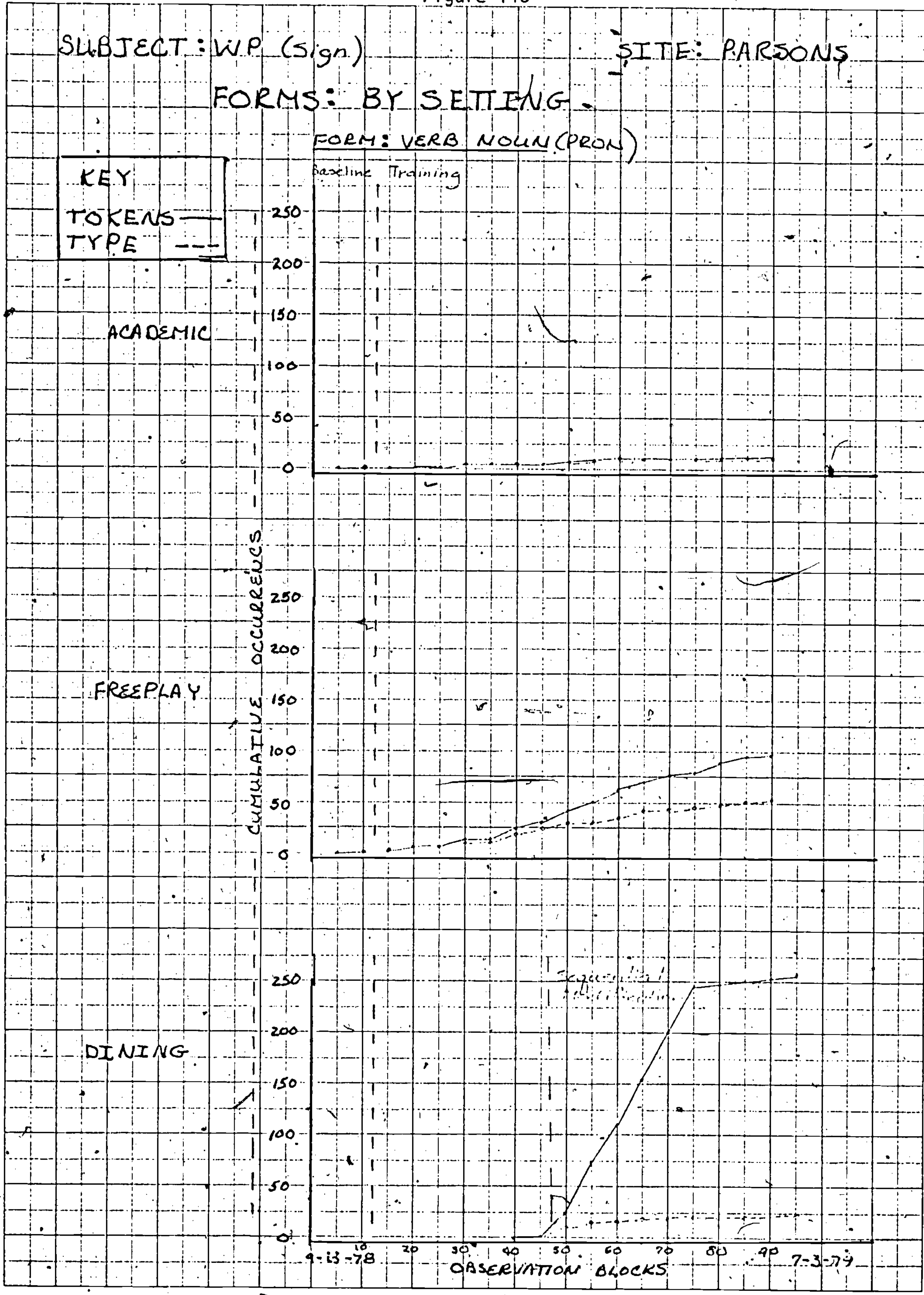

SUBJECT: WP (Sign)
SITE: PARSONS
FORMS: BY SETTING
FORM: (PRON) NOUN VERB NOUN (PRON)
Academic
Freeplay
DINING
CUMULATIVE OCCURRENCES
20
10
0
40
30
20
10
0
240
220
200
180
160
140
120
100
80
60
40
20
0
KEY
TOKENS
TYPES
10
20
30
40
50
60
70
80
90
100
9-13-78
OBSERVATION BLOCKS
7-3-79

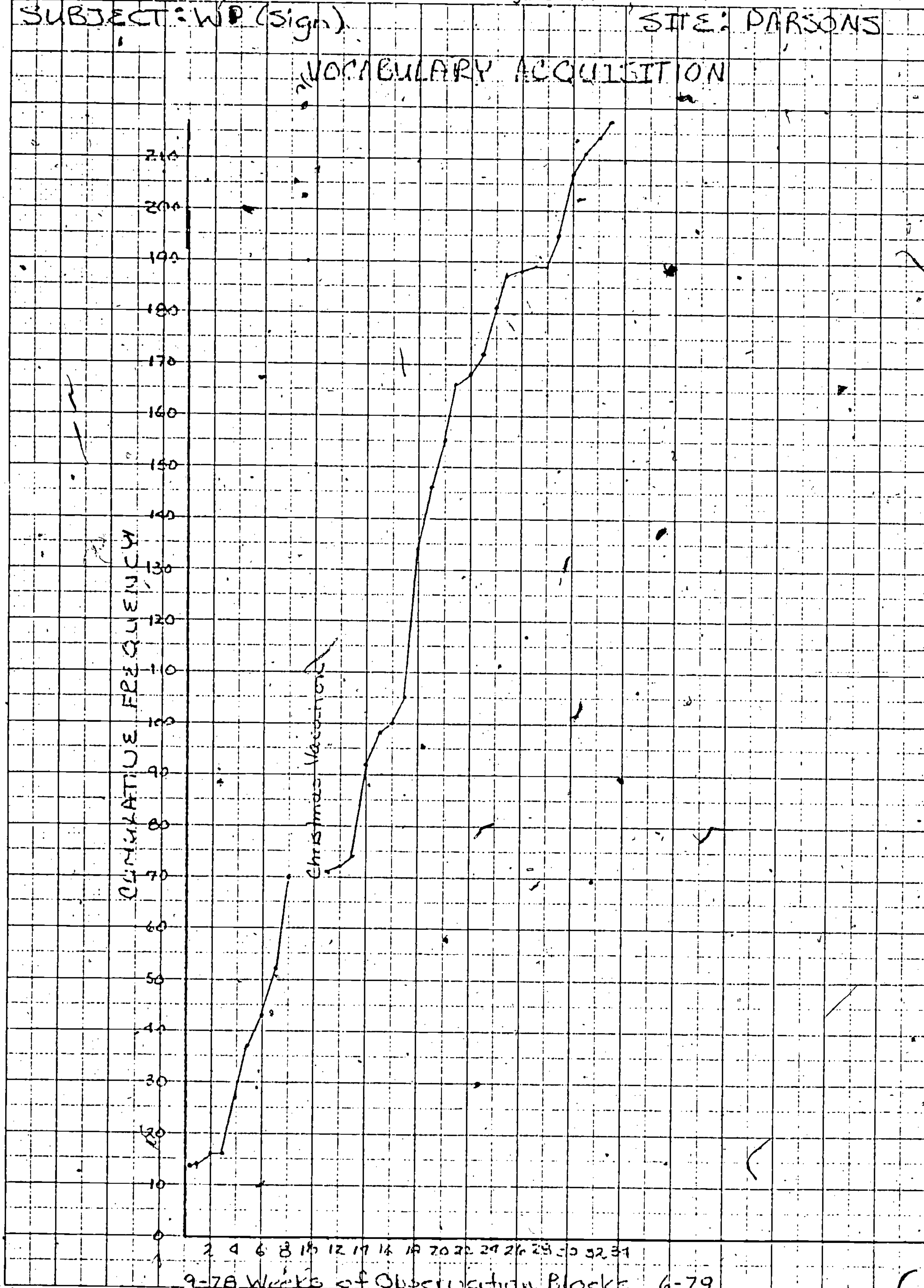
Figure 143




No R-2470-10 C (12 06 10) 10 mm. to a cm. • Made in U.S.A.

VR. VERNON ROYAL INC ELIZABETH, N.J. 07208

Figure 144



SUBJECT: WP (Sign)
SITE: PARSONS
VOCABULARY ACQUISITION
CUMULATIVE FREQUENCY
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
Christmas Vacation
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
9-78 Weeks of Observation Blocks 6-79

Figure 145

LINGUISTIC COMPLEXITY ANALYSIS

Name: W.P. Number of Utterances: 50/10 samples

| | | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Setting | Date | Sessions | MLU | MLU (Ex) | L. Utterance | Nominals | Verbs | TTR |
| Breakfast | 3-29-78 | 4 | 1.72 | | 3 | .78 | .80 | .19 |
| " | 5-1-79 | 2 | 1.54 | | 3 | .94 | .56 | .19 |
| " | 5-21-79 | 3 | 1.56 | | 3 | .94 | .54 | .17 |
| Lunch | 11-21-78 | 5 | 1.44 | | 3 | 1.10 | .34 | .24 |
| " | 3-29-79 | 3 | 1.66 | | 3 | .96 | .64 | .24 |
| " | 5-11-79 | 2 | 1.82 | | 4 | 1.20 | .70 | .23 |
| Freeplay | 10-20-78 | 7 | 1.38 | | 3 | .38 | .34 | .19 |
| " | 1-22-79 | 5 | 1.70 | | 3 | 1.18 | .18 | .27 |
| " | 3-1-79 | 4 | 1.22 | | 2 | .84 | .38 | .17 |
| " | 3-26-79 | 4 | 1.18 | | 3 | .64 | .52 | .27 |
| " | 4-18-79 | 3 | 1.22 | | 3 | .72 | .44 | .18 |
| " | 5-15-79 | 4 | 1.42 | | 3 | .86 | .50 | .24 |
| Academic | 10-16-78 | 5 | 1.22 | | 4 | .98 | .16 | .30 |
| " | 2-22-79 | 6 | 1.30 | | 3 | .66 | .26 | .25 |
| " | 3-21-79 | 4 | 1.44 | | 3 | .92 | .24 | .20 |
| " | 4-11-79 | 6 | 1.72 | | 3 | 1.32 | .40 | .10 |
| " | 5-10-79 | 5 | 1.38 | | 5 | .96 | .22 | .21 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Subject: K.M.

Site: Parsons

Figures 146 through 154

Figure 146

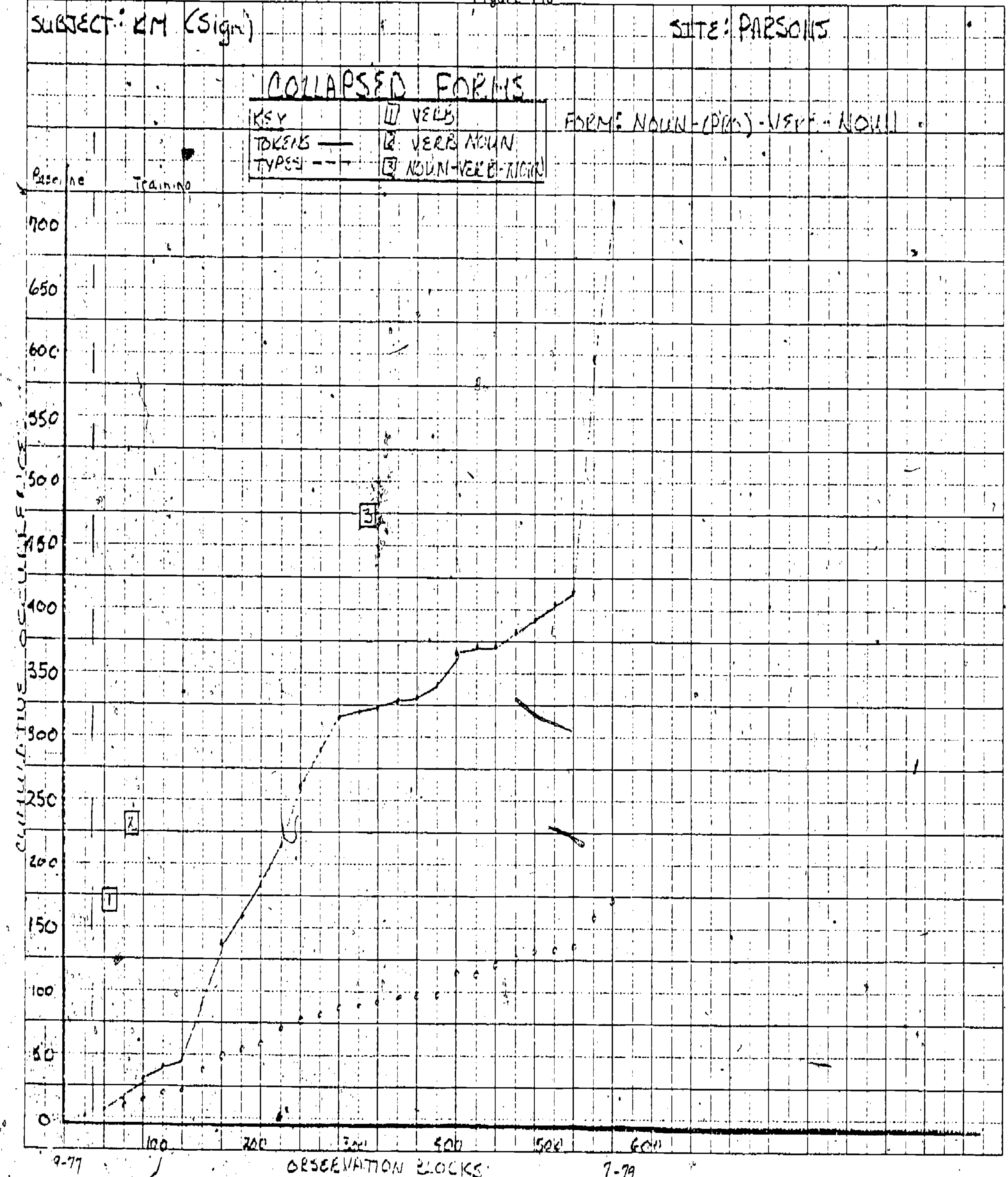
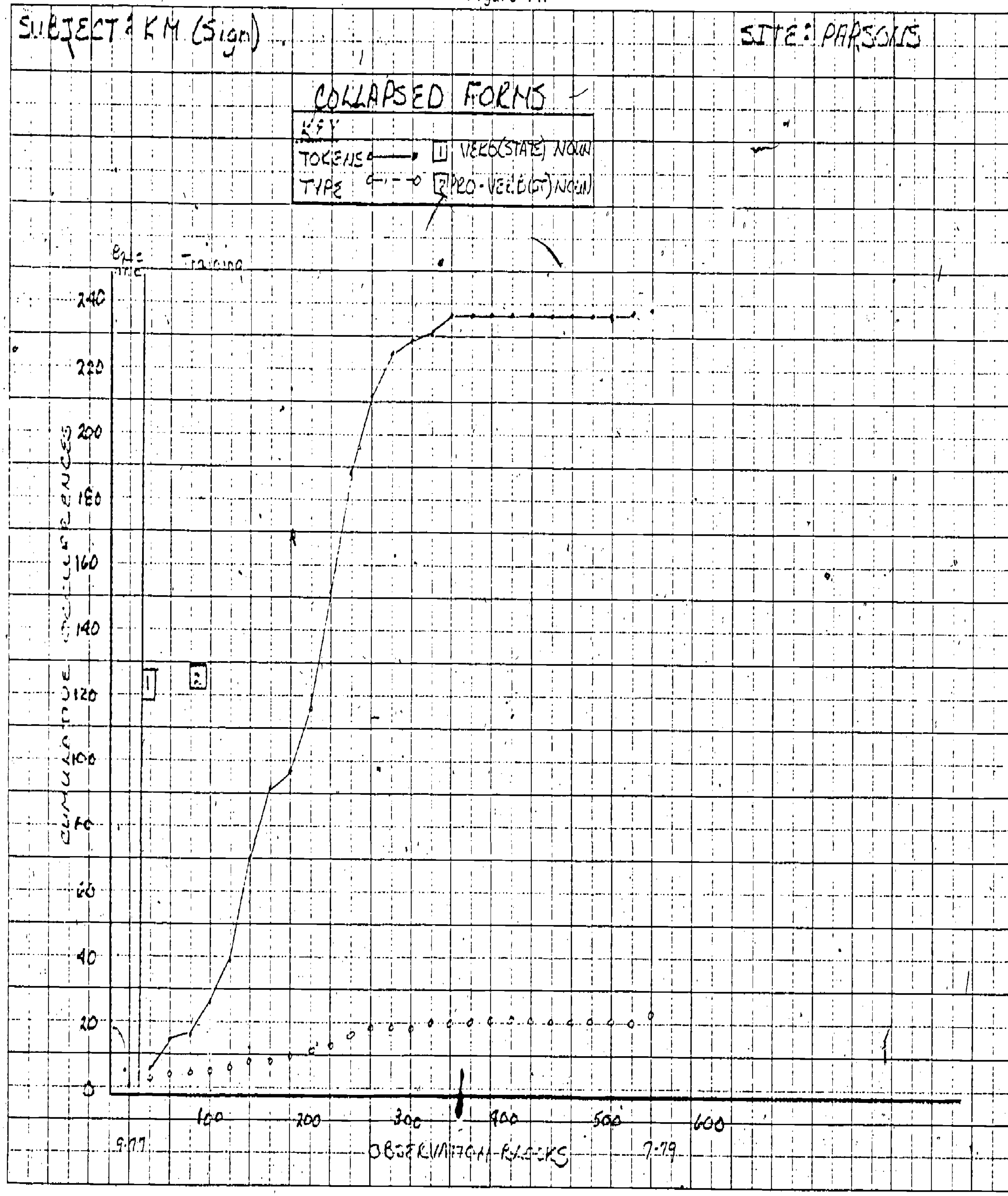

SUBJECT: KM (Sign)
SITE: PARSONS
COLLAPSED FORMS
KEY
TOKENS
TYPES
1 VERB
2 VERB NOUN
3 NOUN-VERB-NOUN
FORM: NOUN-(PRO)-VERB-NOUN
Baseline
Training
CUMULATIVE OCCURRENCE
OBSERVATION BLOCKS
9-77
7-79

Figure 147



SUBJECT: K M (Sign)
SITE: PARSONS
COLLAPSED FORMS
KEY
TOKENS
TYPE
1 VERB(STATE) NOUN
2 PRO-VERB(ST) NOUN
Training
240
220
200
180
160
140
120
100
80
60
40
20
0
1
2
100
200
300
400
500
600
9-77
7-79

Figure 148

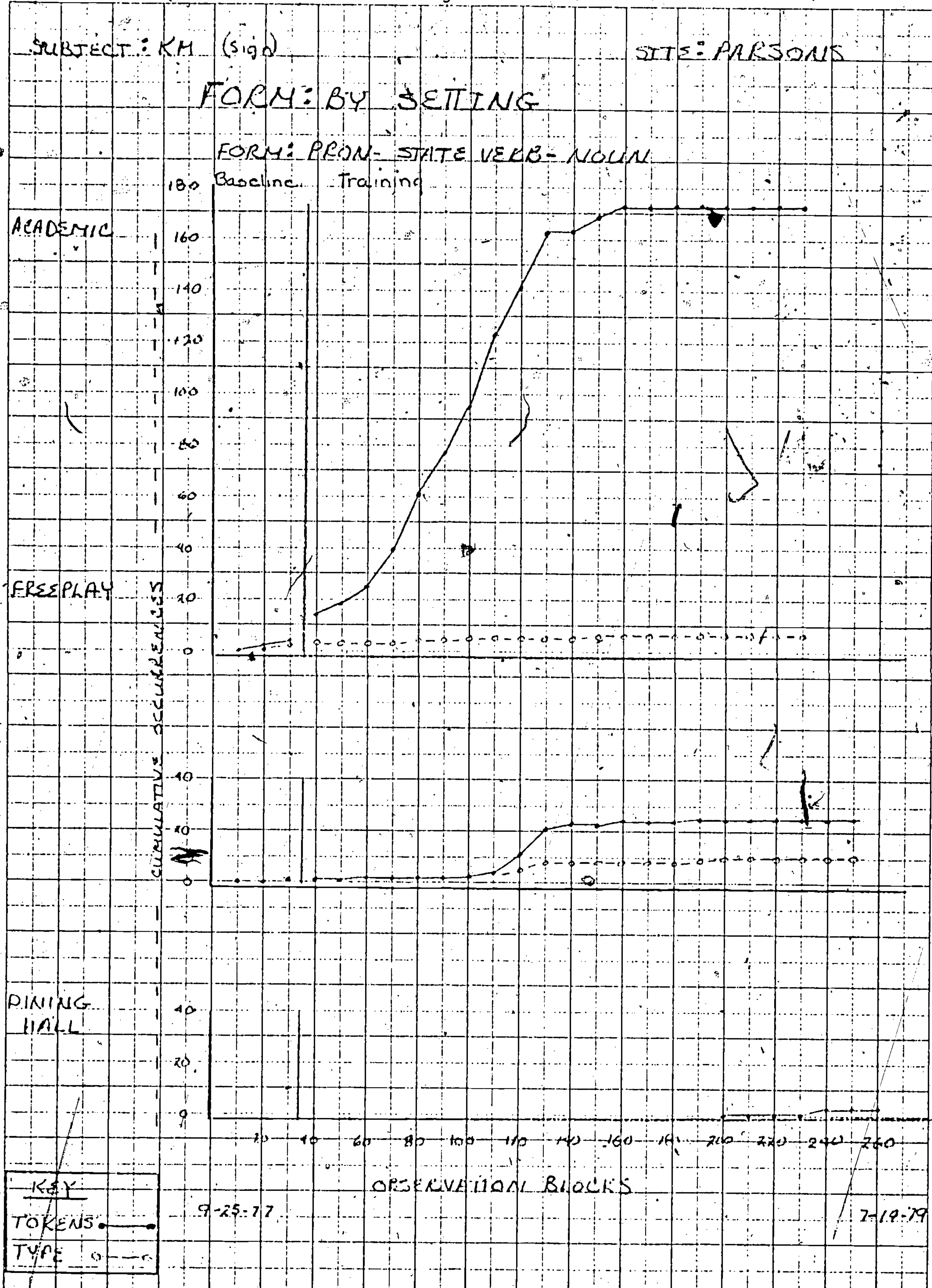

SUBJECT: KM (sign)
SITE: PARSONS
FORM: BY SETTING
FORM: PRON- STATE VERB- NOUN
Baseline
Training
ACADEMIC
FREEPLAY
DINING HALL
CUMULATIVE OCCURRENCES
OBSERVATIONAL BLOCKS
KEY
TOKENS
TYPE
9-25-77
7-19-79

Figure 149

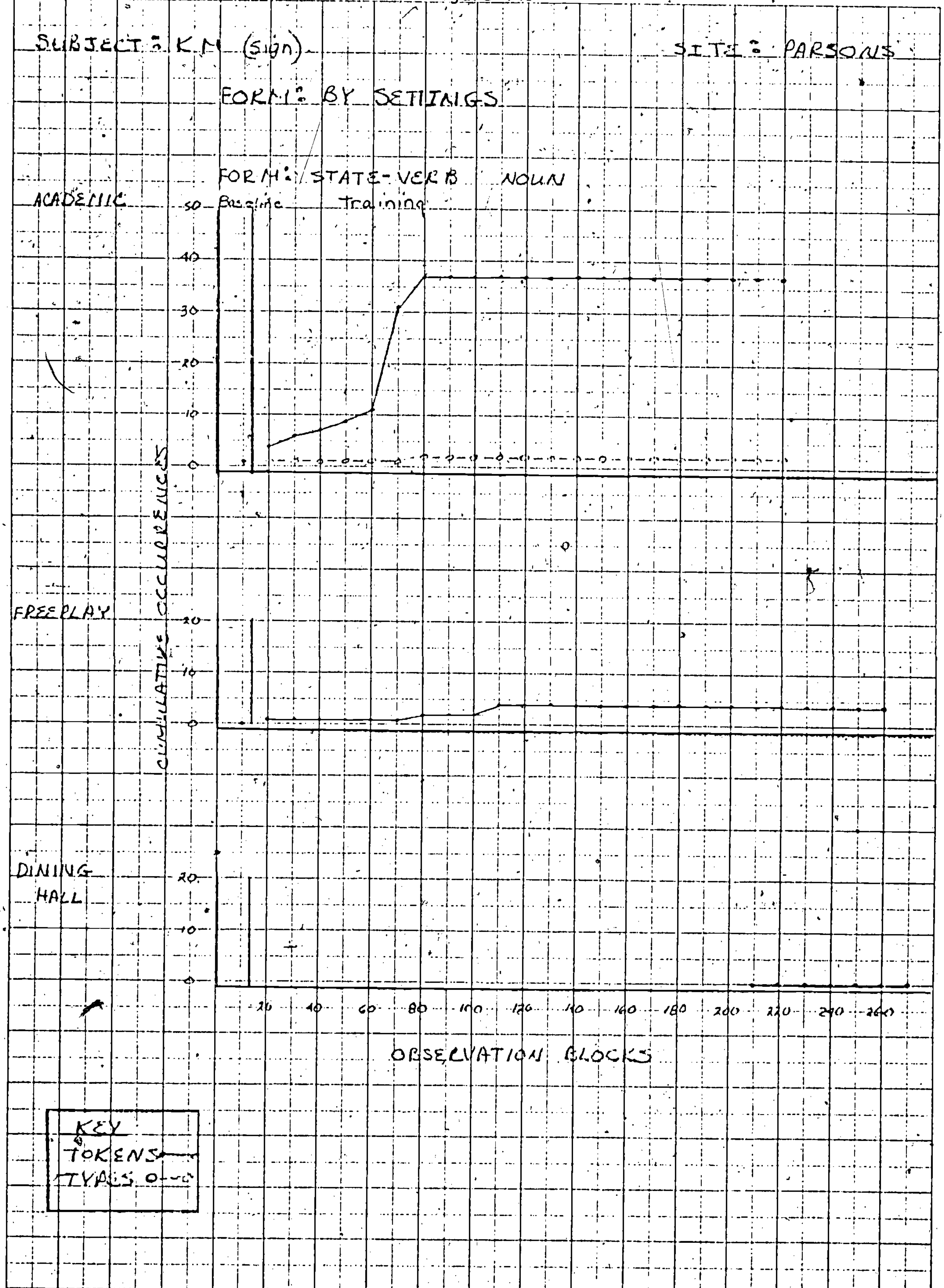
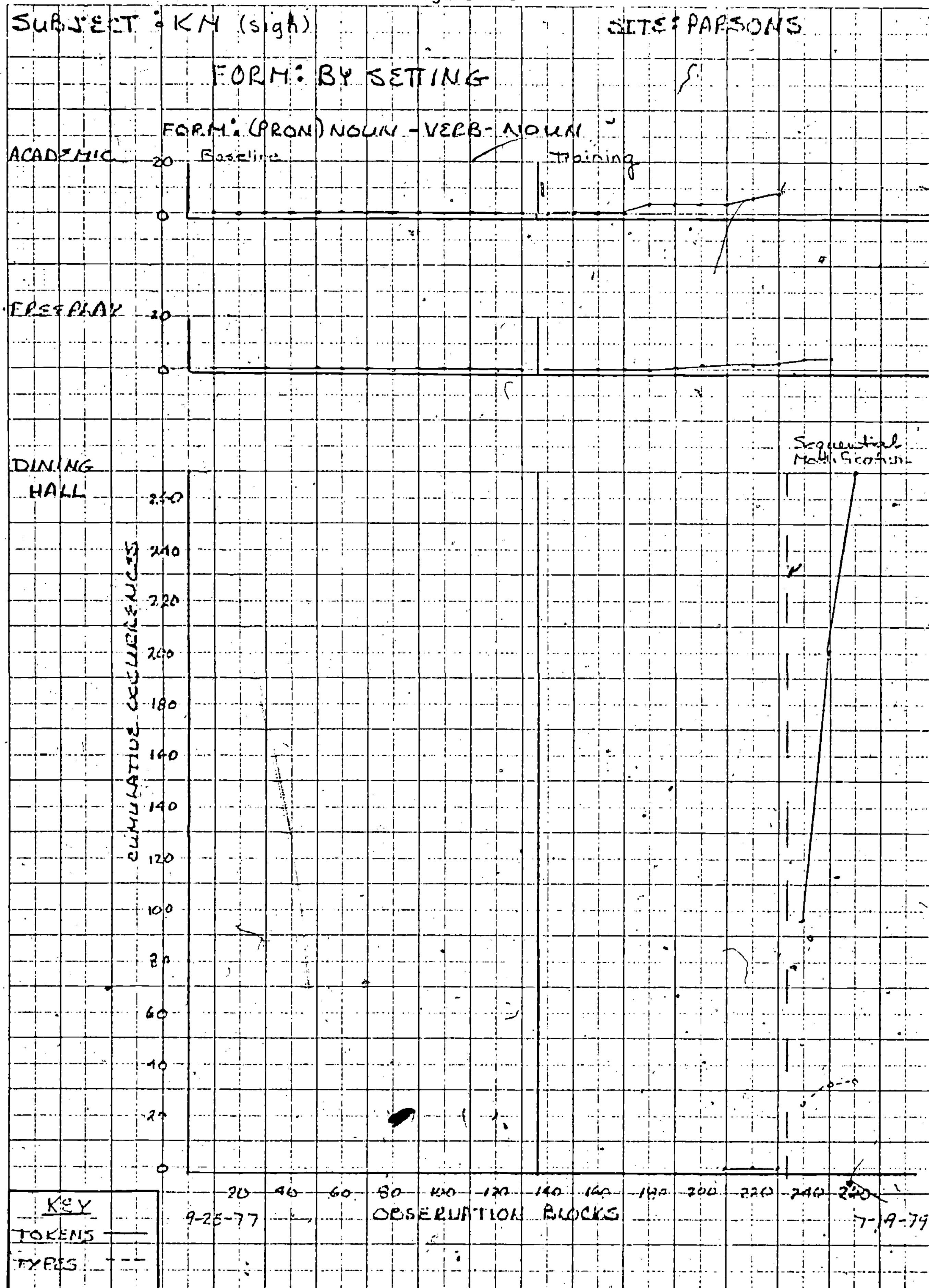
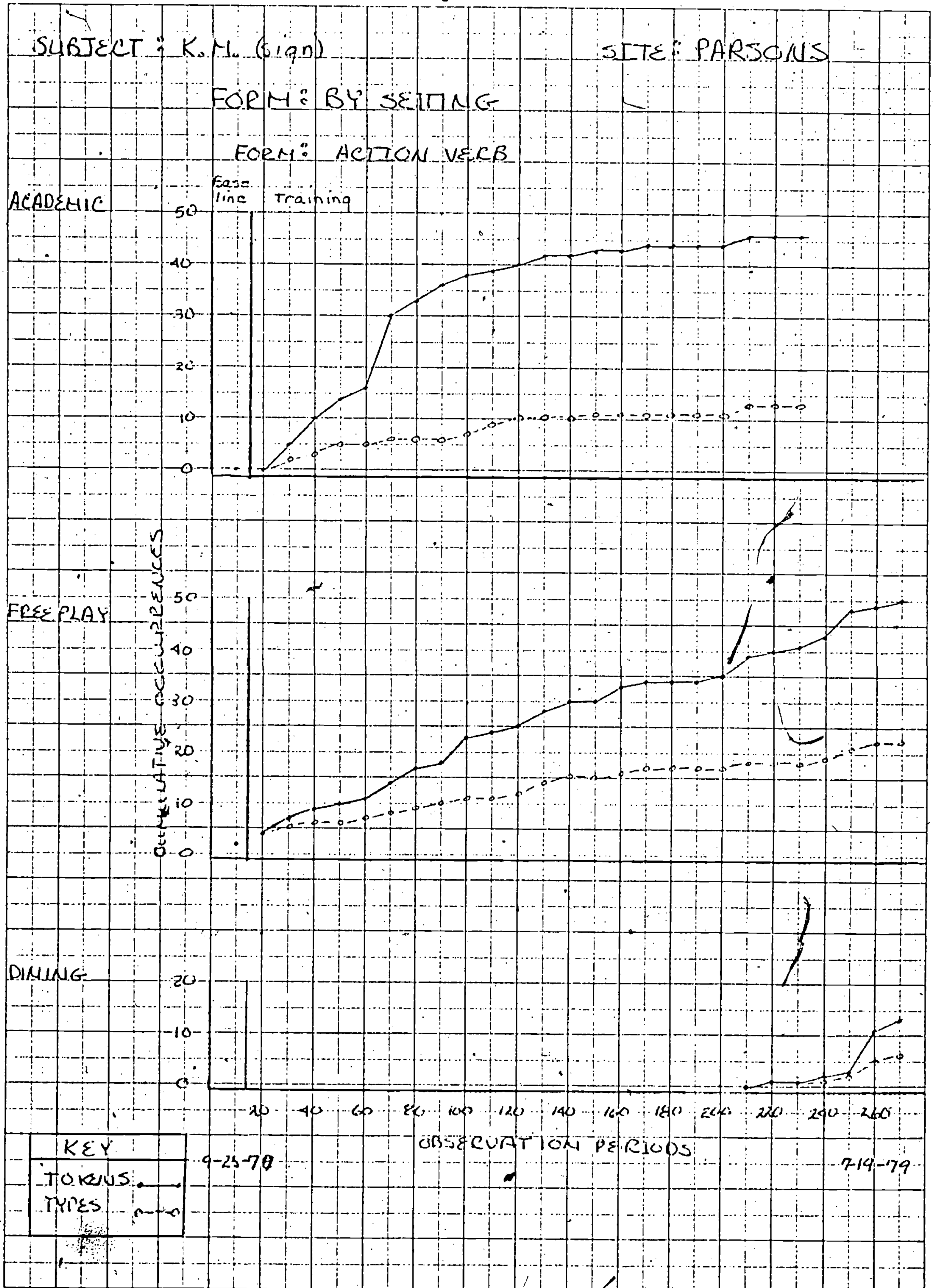

SUBJECT: K.M. (sign)
SITE: PARSONS
FORM: BY SETTINGS
FORM: STATE-VERB NOUN
ACADEMIC
Baseline
Training
FREEPLAY
DINING HALL
CUMULATIVE OCCURRENCES
OBSERVATION BLOCKS
KEY
TOKENS
TYPES

Figure 150



SUBJECT: KM (sigh)
SITE: PARSONS
FORM: BY SETTING
FORM: (PRON) NOUN - VERB - NOUN
ACADEMIC
Baseline
Training
FREEPLAY
DINING HALL
Sequential Modification
CUMULATIVE OCCURRENCES
OBSERVATION BLOCKS
9-25-77
7-19-79
KEY
TOKENS
TYPES

Figure 151



SUBJECT: K.M. (sign)
SITE: PARSONS
FORM: BY SETTING
FORM: ACTION VERB
Base line
Training
ACADEMIC
FREE PLAY
DINING
CUMULATIVE OCCURRENCES
OBSERVATION PERIODS
9-25-78
7-19-79
KEY
TOKENS
TYPES

Figure 152

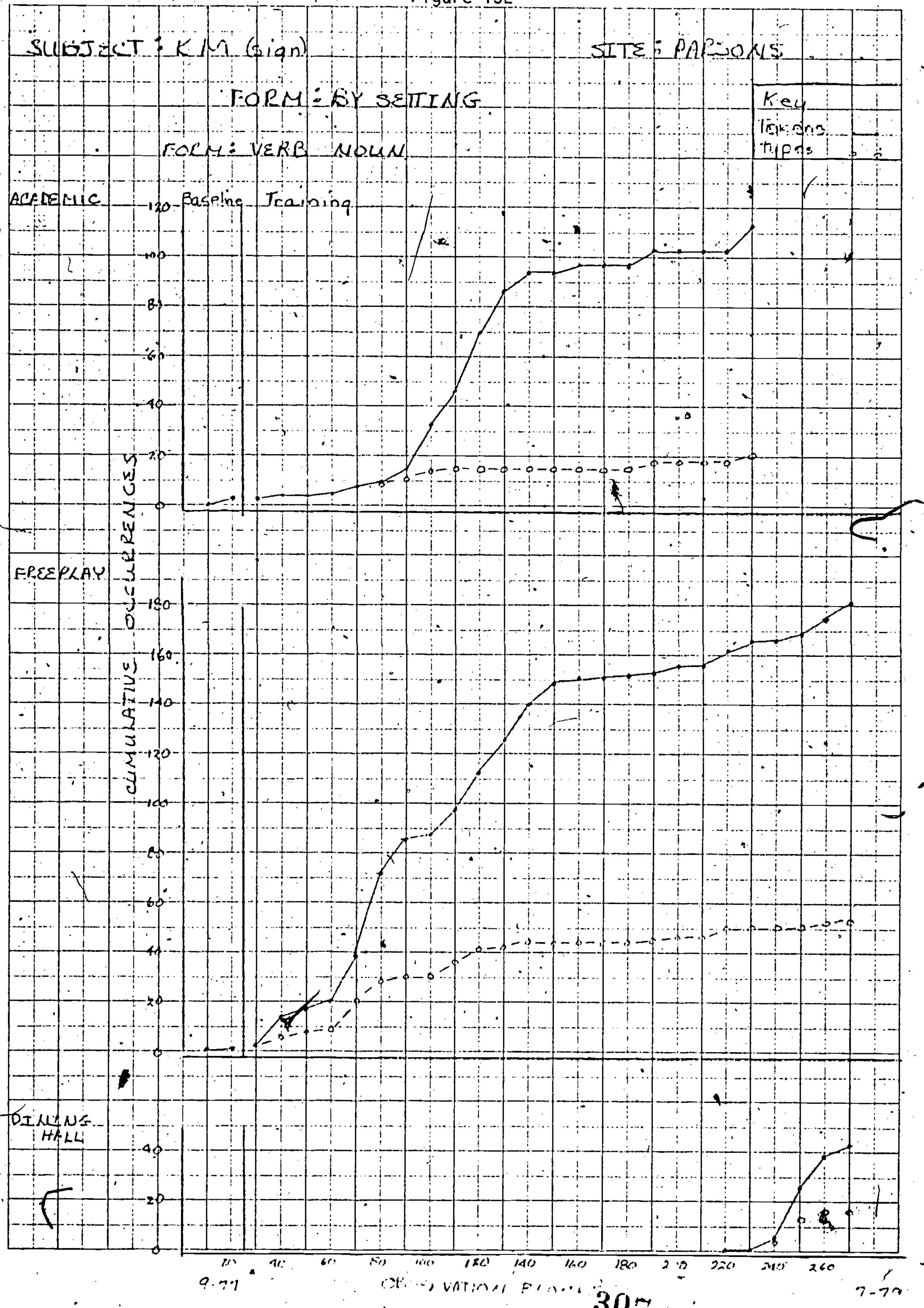

SUBJECT: KM (sign)
SITE: PARSONS
FORM: BY SETTING
FORM: VERB NOUN
Key
tokens
types
ACADEMIC
FREEPLAY
DINING HALL
Baseline
Training
CUMULATIVE OCCURRENCES
OBSERVATIONAL PERIODS
9-77
7-78
No R 2470 10 C-19 0610 10 mm. to a cm. Made in U.S.A.
VERNON ROYAL INC

Figure 153

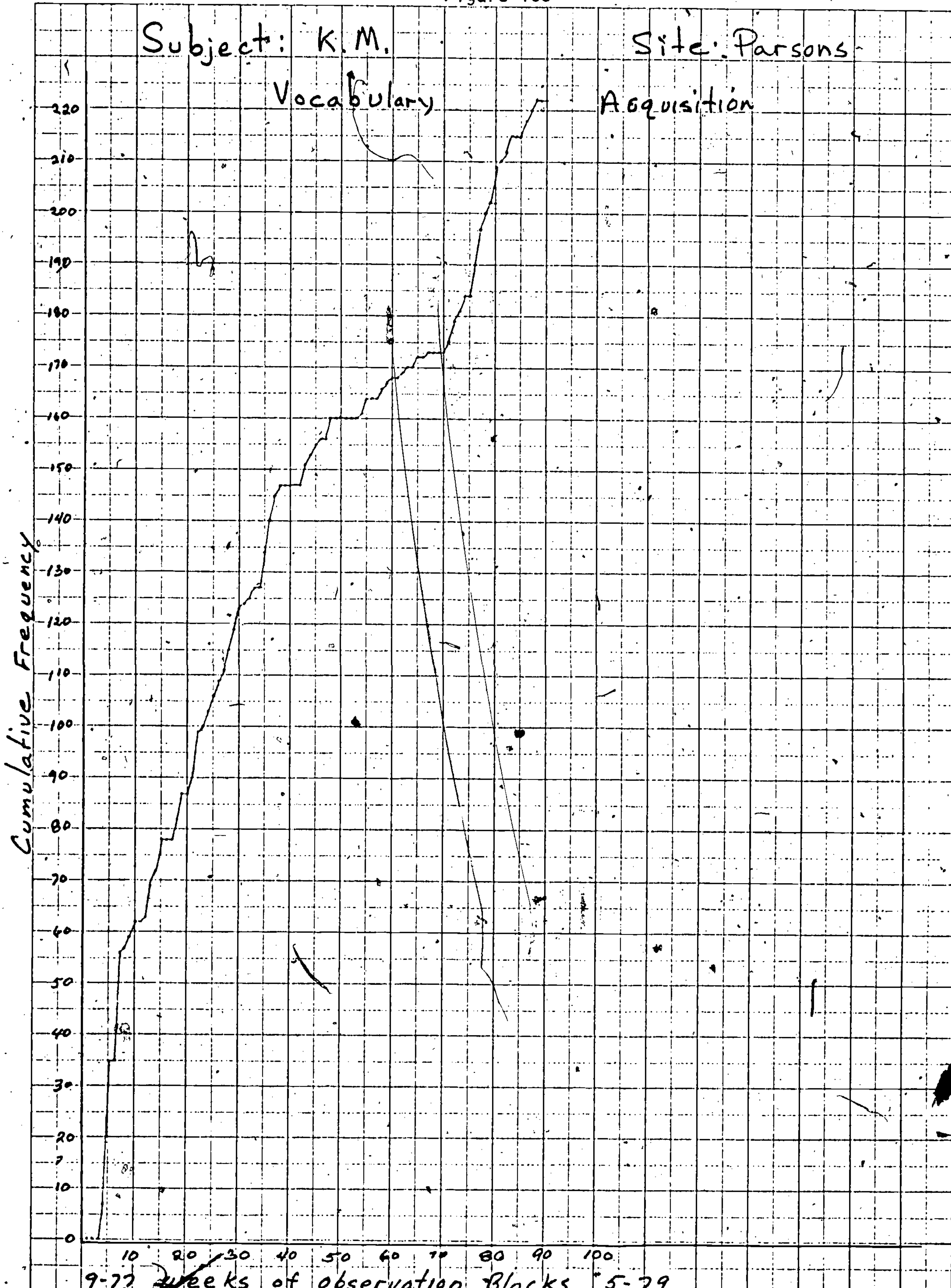

Subject: K.M.
Site: Parsons
Vocabulary Acquisition
Cumulative Frequency
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
10
20
30
40
50
60
70
80
90
100
9-72 weeks of observation Blocks 5-79

Figure 154
LINGUISTIC COMPLEXITY ANALYSIS

Name: K.M. Number of Utterances: 50/40 samples

| | | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Setting | Date | Sessions | MLU | MLU (Ex) | L. Utterance | Nominals | Verbs | TTR |
| Breakfast | 3-29-79 | 33 | 2.40 | | 4 | 1.34 | .70 | .13 |
| Lunch | 9-14-78 | 32 | 1.40 | | 3 | .7 | .46 | .24 |
| " | 3-14-79 | 5 | 2.14 | | 4 | 1.18 | .88 | .11 |
| Freeplay | 9-25-77 | 20 | 1.14 | | 2 | .86 | .20 | .16 |
| " | 2-21-78 | 11 | 1.66 | | 2 | .94 | .70 | .11 |
| " | 5-26-78 | 6 | 1.42 | | 3 | 1.16 | .26 | .08 |
| " | 10-9-78 | 37 | 1.20 | | 3 | 1.02 | .54 | .24 |
| " | 3-30-79 | 18 | 1.30 | | 3 | .76 | .18 | .15 |
| Academic | 9-26-77 | 4 | 1.00 | | 1 | .74 | .12 | .13 |
| " | 2-1-78 | 2 | 1.04 | | 3 | 1.34 | .06 | .13 |
| " | 4-18-78 | 2 | 1.36 | | 4 | 1.04 | .22 | .21 |
| " | 8-9-78 | 2 | 1.52 | | 4 | 1.1 | .42 | .17 |
| " | 2-26-79 | 3 | 1.10 | | 2 | .58 | .26 | .11 |
| " | 5-10-79 | 3 | 1.14 | | 3 | 1.18 | .52 | [illegible]8 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

# APPENDIX VI

## Ecological Study Abstracts

# An Ecological Approach to Increasing Language Usage During Mealtimes

Alan Van Biervliet

Paul F. Spangler

Ann M. Marshall

Kansas Neurological Institute

and

University of Kansas

In view of the somewhat structured circumstances and the regularity with which meals occur in institutions for retarded persons, mealtimes appear to be ideal times for the programming of the maintenance and generalization of language skills. Unfortunately, currently these mealtimes can be characterized as hurried, unpleasant, and disruptive events with little or no appropriate language occurring. The institutional style in which meals are served appears to inhibit appropriate peer interactions. An ecological program alternative to institutional style involves serving meals family style. Family-style meal service would seem to ensure that a certain amount of peer interactions occurs ( e.g., passing food) and it would also seem to set the occasion for a certain degree of peer-directed language (e.g., requesting food). The purpose of the study was to examine both the feasibility of serving family-style meals and the effects that family-style meal service had on mealtime language.

## Method

### Participants, Setting, and Apparatus

Five moderately to severely retarded young adult male residents at Kansas Neurological Institute (KNI) participated in this study. All of the participants had some conversational skills and they had appropriate table manners. The study took place in the dining room in which they had eaten for over six months and their seating arrangements remained the same throughout the project. Other than stopwatches and videotape equipment, the only equipment that were required were the various bowls, platters, and utensils that were needed for family style serving.

Institutional Style Procedures

In short, institutional style procedures involved the dietary personnel dishing out individual portions onto specialized trays which were delivered to the dining rooms. Staff members then distributed the trays to the residents one at a time. When the residents finished eating, they placed their trays onto carts.

Family Style Procedures

This involved the dietary personnel placing the participants' food onto bowls and platters which were delivered to the dining room. The participants set their table upon entry into the dining room. During the meal the participants passed the serving bowls, platters, and beverages around the table and they removed individual portions as the food was passed. When the participants finished eating they shared in clearing and cleaning the table.

Experimental Design and Data Collection

The research design consisted of a multiple baseline across the three daily meals. During all baseline conditions meals were served institutional style, and during all intervention conditions meals were served family style. The order of intervention was dinner, lunch, and then breakfast. Follow-up data was collected approximately four months after the meal service change occurred for dinner.

Data collection procedures during the different conditions were identical. During the meal each participant was observed for 3-min intervals, during which time the participant's verbalizations were coded and recorded according to its type (imitation, response, or unintelligible), its content (request for food, comment about the meal, or miscellaneous conversation), and its direction (towards staff, peer, observer, self, or group). As the participants finished their meals, the observers recorded the amount of time spent with the meal.

## Results

The average number of verbalizations per minute for all five participants during baseline and intervention conditions are presented in Figure 1. As can be noted, the average number of verbalizations per minute were substantially higher during family-style meals then institutional-style meals. In addition, the follow-up data, presented by the vertical bars, indicate that the increased rates of mealtime verbalizations maintained fairly well over an extended period of time.

Although all of the participants showed some increases in verbalization rates during family-style meals, there were some individual differences which can be seen in Figure 2. C.E., S.W., and P.S. had similar increases in verbalization rates following the changes to family-style meals. R.J., who rarely spoke during institutional-style mealtimes, spoke at a fairly low but consistent rate during family-style meals. Finally, B.H., who spoke relatively frequently during institutional-style lunches and breakfasts, did not appear to be affected by the meal service change in regards to verbalization rates except during dinner.

Data concerning to whom the participants spoke are presented in Table 1. These data clearly demonstrate that the increases in verbalization rates during family-style meals were the result of increases in peer-directed verbalizations.

Data concerning the content of the mealtime verbalizations are presented in Table 2. These data indicate that the increases in verbalization rates can be attributed more to increases in meal-related conversation than to increases in requests for food or miscellaneous conversation. In addition, as seen in Table 3, every participant spent considerably more time with their meals when the meals were served family style rather than institutional style.

Consumer Validation

In order to assess the various consumers' satisfaction with the family-style procedures, staff members and concerned community members were given questionnaires, the participants were interviewed, and a diary of events was kept. The results of these measures indicated that all of the consumer groups overwhelmingly preferred family style to institutional style, they recommended the use of family style procedures for other residents, and that family-style procedures were most like the way meals were served in their homes.

## Discussion

The major findings of this project were: (1) family-style serving resulted in substantial increases in peer-directed verbalizations during mealtimes; (2) family-style serving produced differential effects on the participants' mealtime language usage in relation to the complexity of their verbal skills; (3) family-style serving appears to be an effective technique for getting institutionalized retarded individuals to spend more time with their meals; (4) family-style meal service is a practical alternative to institutional-style meal service in residential training facilities; and (5) family style is judged to be more home-like in nature and it is preferred by the consumers of institutional services.

At the present time several other living groups and classrooms are switching from institutional-style to family-style dining.

FIGURE 1

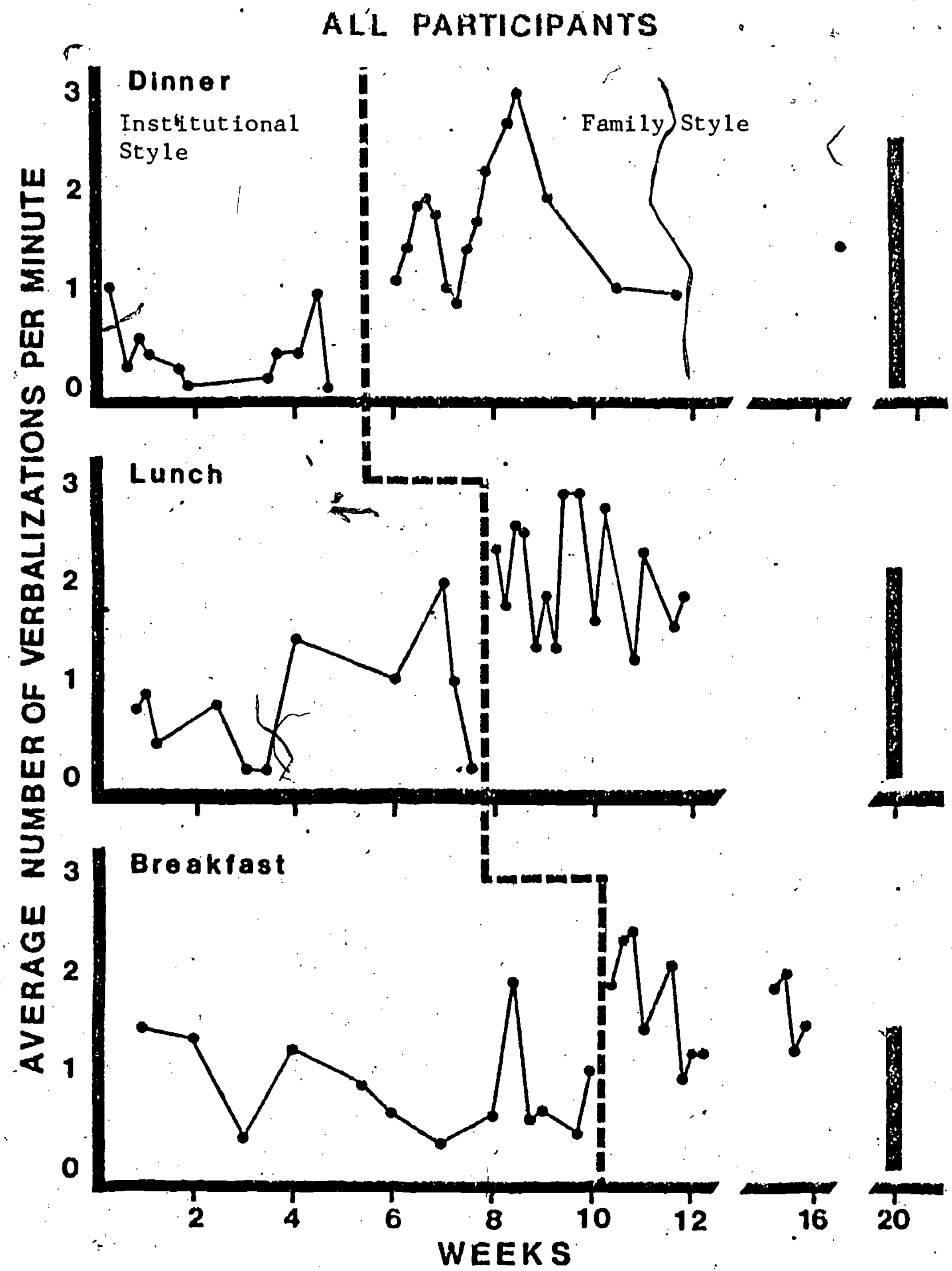

ALL PARTICIPANTS
Dinner
Institutional
Style
Family Style
Lunch
Breakfast
AVERAGE NUMBER OF VERBALIZATIONS PER MINUTE
0
1
2
3
2
4
6
8
10
12
16
20
WEEKS

FIGURE 2

# Individual Participants' Average Number of Verbalizations Per Minute During Each Experimental Condition*

| | | Institutional Style | Family Style | | |
|---|---|---|---|---|---|
| C.E. | Dinner | .1 | 1.6 | 2.1 | 1.8 |
| | Lunch | .3 | 1.6 | 2.3 | 1.0 |
| | Breakfast | .5 | .3 | .5 | 2.5 |
| S.W. | Dinner | .9 | 2.8 | 3.7 | 2.3 |
| | Lunch | 1.2 | 1.1 | 3.2 | 3.6 |
| | Breakfast | 1.7 | .4 | .9 | 2.0 |
| P.S. | Dinner | .5 | 1.1 | 3.9 | 2.4 |
| | Lunch | .2 | 1.6 | 2.2 | 3.5 |
| | Breakfast | .9 | .6 | 1.2 | 1.6 |
| R.J. | Dinner | 0 | .4 | 1.0 | .1 |
| | Lunch | .1 | 0 | .7 | .5 |
| | Breakfast | 0 | 0 | 0 | .5 |
| B.H. | Dinner | .4 | 1.5 | 2.1 | .7 |
| | Lunch | 1.7 | 1.1 | 1.7 | 1.3 |
| | Breakfast | 2.5 | .7 | 2.6 | 1.8 |

*The solid black line indicates the time at which the meal was changed from institutional style to family style. The numbers to the left of this line represent the mean number of verbalizations per minute during the baselines (institutional style meals). The numbers to the right of the line represent the mean number of verbalizations per minute during the intervention conditions (family style meals).

TABLE 1

# Average Number of Staff-Directed, Peer-Directed, and Observer-Directed Verbalizations Per Minute for Each Condition

| | | Staff-Directed | | | Peer-Directed | | | Observer-Directed | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dinner | Lunch | Breakfast | Dinner | Lunch | Breakfast | Dinner | Lunch | Breakfast |
| C.E. | Institutional Style | 0 | 0 | .1 | .1 | .2 | 0 | 0 | 0 | 0 |
| | Family Style | .1 | 0 | .1 | .5 | .5 | .7 | 0 | 0 | 0 |
| S.W. | Institutional Style | .1 | .1 | .1 | .1 | .2 | .2 | 0 | 0 | 0 |
| | Family Style | 0 | .1 | 0 | .9 | 1.0 | .6 | .1 | .1 | 0 |
| P.S. | Institutional Style | 0 | 0 | 0 | .1 | .3 | .3 | 0 | 0 | 0 |
| | Family Style | 0 | .1 | 0 | .8 | .8 | .6 | 0 | 0 | 0 |
| R.J. | Institutional Style | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Family Style | 0 | 0 | 0 | .1 | .2 | .1 | 0 | 0 | 0 |
| B.H. | Institutional Style | 0 | .1 | .1 | 0 | .4 | .4 | 0 | 0 | 0 |
| | Family Style | .1 | .1 | .1 | .4 | .4 | .5 | 0 | 0 | 0 |

TABLE 2

# Average Number of Requests for Food, Comments About the Meal, and Conversational Speech Verbalizations Per Minute During Each Condition

| | | Requests for Food | | | Comments about the Meal | | | Conversational Speech | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dinner | Lunch | Breakfast | Dinner | Lunch | Breakfast | Dinner | Lunch | Breakfast |
| C.E. | Institutional Style | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .2 | .1 |
| | Family Style | .1 | .1 | .2 | .3 | .4 | .4 | .2 | .2 | .2 |
| S.W. | Institutional Style | 0 | 0 | .1 | .1 | 0 | .1 | .3 | .2 | .3 |
| | Family Style | .1 | .1 | 0 | .8 | .9 | .5 | .1 | .2 | .1 |
| P.S. | Institutional Style | 0 | 0 | 0 | 0 | .1 | .1 | 0 | .2 | .3 |
| | Family Style | .1 | .1 | 0 | .4 | .4 | .4 | .2 | .3 | .1 |
| R.J. | Institutional Style | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Family Style | .1 | .2 | .1 | 0 | 0 | 0 | 0 | 0 | 0 |
| B.H. | Institutional Style | 0 | 0 | 0 | 0 | .1 | .1 | .1 | .4 | .5 |
| | Family Style | .1 | .1 | 0 | .3 | .2 | .4 | .1 | .2 | .2 |

TABLE 3

Average Lengths of the Meal
(in minutes)

| | | Dinner | Lunch | Breakfast |
|---|---|---|---|---|
| C.E. | Institutional Style | 8.75 | 9.53 | 9.95 |
| | Family Style | 17.55 | 17.26 | 19.10 |
| S.W. | Institutional Style | 7.57 | 9.55 | 9.55 |
| | Family Style | 16.78 | 17.55 | 19.55 |
| P.S. | Institutional Style | 6.50 | 7.55 | 7.45 |
| | Family Style | 13.78 | 12.58 | 16.95 |
| R.J. | Institutional Style | 7.89 | 11.25 | 9.47 |
| | Family Style | 16.95 | 17.74 | 18.20 |
| B.H. | Institutional Style | 9.56 | 12.72 | 13.20 |
| | Family Style | 16.92 | 17.59 | 20.45 |

Teaching Conversational Skills to Young Children

Linda Paul

Language Project Preschool

Attempts to increase the rate of talking between children can focus on promoting display or already acquired behaviors or on teaching particular behaviors. The purpose of the present study was to teach children skills that would help them talk more effectively to their peers. Previous investigations, and our own observations of language delayed children, indicated that they do not talk to their peers very frequently.

Method

Six preschool children, ranging in age from 2.9 to 4.1 years were subjects. Children were observed in dyads while playing unsupervised in a room outside the classroom. During the 10-min session, the conversations were tape-recorded. An observer recorded the distance between the children and if they looked at one another. From written transcripts of the tapes the following categories were scored: attentional utterances (e.g., look, see, hey, watch, proper names), questions and contingent responses (responses following verbalization by other child and related to that preceding verbalization). Four skills, attending, asking questions and responding, were taught to children in a multiple baseline across behaviors. Teaching involved modeling, prompting, shaping, and reinforcing. Skills were taught to both members of a dyad during several 15-min training sessions. Training was conducted by an adult who was familiar with the children and with the training procedures.

Generalization of training was then measured in the dyadic (nontraining) sessions and in a group play period involving all six children.

When the skills had been trained, a generalization facilitating procedure was added. The children were instructed to practice certain skills in the dyadic and the group settings. At the end of the play sessions, the children reported if they had practiced the skills and were reinforced for true reports.

Results

Most children demonstrated an increase in rates of targeted behaviors following the introduction of training, however, variability in baseline and training data suggested that the effects were not stable. Adding reporting as a generalization facilitation procedure also had variable effects.

Discussion

While the data were not very conclusive, the strategy used in the present study merits further attention. Selection of critical behaviors and more effective training might lead to stronger results. More attention needs to be paid to the composite of behaviors that make a child a successful social language user.

# Increasing Rates of Talking Between Peers

Linda Paul

Language Project Preschool

Children with delayed language development represent a very varied group of handicapped children. Language delay may take the form of poor receptive mastery of language, limited vocabulary syntactic, semantic or functional language acquisition and usage. Deficits in language production may be particularly evident when children talk to their peers. The purpose of the present study was to increase the rate at which children talk to one another in a dyad situation.

## Methods

Six preschool children, ranging in age from 2.9 to 4.1 years were subjects. Three children were non-language delayed and the other three children were considered language delayed.

The children were observed in dyadic 10-min play sessions and their conversations were tape recorded. All tapes were trancribed and a tally of the number of utterances spoken by each child was made. After collecting baseline data on all possible combinations of children, the three dyadic combinations with the lowest rates of talking were selected to participate in the intervention.

Two rate-increasing strategies were introduced in a multiple baseline fashion across dyads. The first strategy was to instruct the non-language delayed child to talk to the language delayed child. The second strategy was to present tokens to the non-delayed child each time he/she talked to the language delayed child. In both conditions, a sufficiently high rate (based on a predetermined criterion) of talking enabled the non-delayed child to receive a tangible reinforcer.

## Results

For five of six children, instructions were not sufficient to maintain an increased rate of peer-directed talking. The instructions had the greatest effect on Bette and Donna. Adding the token-based contingency to the instructions increased the rate of talking between Bill and Wes, but did not increase the rate of talking between Janie and Dan. There was not sufficient time in the school year to introduce the token intervention to Bette and Donna.

Discussion

Instructing children to talk to one another is not sufficient to promote verbal interactions. Adding a tangible consequence (i.e., tokens) for complying with instructions had only a modest effect. The interventions tried in this investigation may be a means to increase verbal interaction if the reason children are not talking to one another is due to insufficient motivation. Children who are skilled conversationalists may need to be "hooked" into displaying the behavior. However, if children do not have the conversational skills, they must acquire or be taught the critical behaviors before instructions and/or consequences will be effective in increasing their rates of talking.

Using Tokens to Increase Peer Directed Speech

Linda Paul

Language Project Preschool

The typical language training situation involves a child with deficient language skills and an adult who is the teacher or trainer. In some instances, two or more children may be trained together. The child or children being trained may learn verbal skills to be displayed in the presence of the language trainer. Perhaps this behavior will generalize to nontraining settings. Part of this generalization would then involve responding in the presence of other people. Possibly due to the nature of the training, a child may generalize to adult/child verbal interactions but fail to generalize to child/child verbal interactions. A child's speech is enhanced syntactically and semantically when the listener is an adult or older speaker. The adult draws more language from the child. The adult interprets child speech and elaborates on it, thereby lessening the child-speaker's work in being understood. Because children do not readily provide such support for other child speakers, it is not unreasonable for language learning children _not_ to generalize from adult/child to child/child situations.

The present investigation attempted to facilitate peer directed verbal interaction using reinforcement. A token system was implemented with three dyads of children. In each dyad, one child was a peer "teacher" or token giver and the other child was a token receiver.

## Method

The subjects were six children, ranging in age from 4.0 to 6.5 years, with a mean age of 5.3. Two children were normal language models; the other children were considered language delayed. However, all of the children had fairly extensive verbal repertoires and used multiword utterances. Table 1 presents the names, ages, and Peabody Picture Vocabulary test scores for the children.

Table 1

| | Name | Age | P.P.V.T. Score* |
|---|---|---|---|
| Teachers | Kelly | 5.7 | ——— |
| | Carol | 6.5 | 69 |
| | Bob | 5.3 | ——— |
| Target Subjects | Jay | 4.0 | 94 |
| | John | 5.1 | 82 |
| | Bill | 5.2 | 116 |

*Peabody Picture Vocabulary Test
Vocabulary/Intelligence Quotient

A baseline measure of the number of times the children in each dyad talked to one another was collected in conjunction with daily 15-min observations of the children during freeplay. The token procedure was introduced to one dyad at a time in a multiple baseline design.

The peer "teacher" was instructed to talk to the target child. The peer "teacher" dispensed a token to the target child when that child responded to the peer "teacher's" initiation. When all of the tokens were dispensed, both children received a small, tangible reinforcer. Following a practice session outside the classroom, the token system was introduced in the classroom for 15 minutes during freeplay.

Results

Dyad 1 During the baseline phase, Kelly and Jay did not talk to one another. The intervention, peer dispensed tokens for talking, increased the interactions between Kelly and Jay, but in a sporadic way. Kelly needed to be prompted to talk to Jay. On some days she did not respond to these prompts, on other days Jay did not respond to all of Kelly's initiations. Jay received the total number of tokens on only 7 out of 26 days.

Dyad 2 Carol and John had a very low baseline rate of talking to one another as well. When the token procedure was initiated, Carol had a high rate of talking to John. John did not respond to all of Carol's initiations, but he did receive all of the tokens on 7 out of 9 days.

Dyad 3 Bob and Bill had a baseline rate that averaged 2.3 to 2.9 interactions in a 15-min sample. When the token procedure was introduced, their rates of verbal interaction showed correlated increases. Bill received all of the tokens on all 7 days of the intervention. It is worth noting that both Bob and Bill were quite competent speakers. In the other dyads, the children were not as socially or cognitively skilled as Bob and Bill. Bill had a severe articulation problem but otherwise had a skill level similar to Bob's.

A comparison of baseline or pre-intervention and intervention mean number of vocalizations and the percentage of days children in a dyad spoke to one another, showed significant change across all pairs of children.

Discussion

While the data indicate that adding a reinforcement dimension to peer verbal interaction will increase the frequency of behavior, some problem areas were also highlighted. Tokens are an artifical reinforcer. While it is hoped that the interactions would be reinforcing enough to allow tokens to be faded out, naturally reinforcing spontaneous verbal interactions were not fostered by the procedure. Carol, for example, would pursue John, yelling, "What are you doing?," and would repeat this initiation until John responded enough times to get all of the tokens. She and John then returned to ignoring each other. Kelly, as was mentioned, often refused to talk to Jay at all.

It should be noted that before attempting to reinforce behavior, one has to build in a behavior (i.e., the children needed to learn some social language skills first). Although these children could converse on many occasions quite well with adults, it was a difficult generalization for them to converse with peers. Adults are able to structure conversational interactions so that a child can respond fairly easily. A peer is unlikely to be able to do this, thereby setting up an interaction which requires different or more complex verbal skills.

Dyad 1

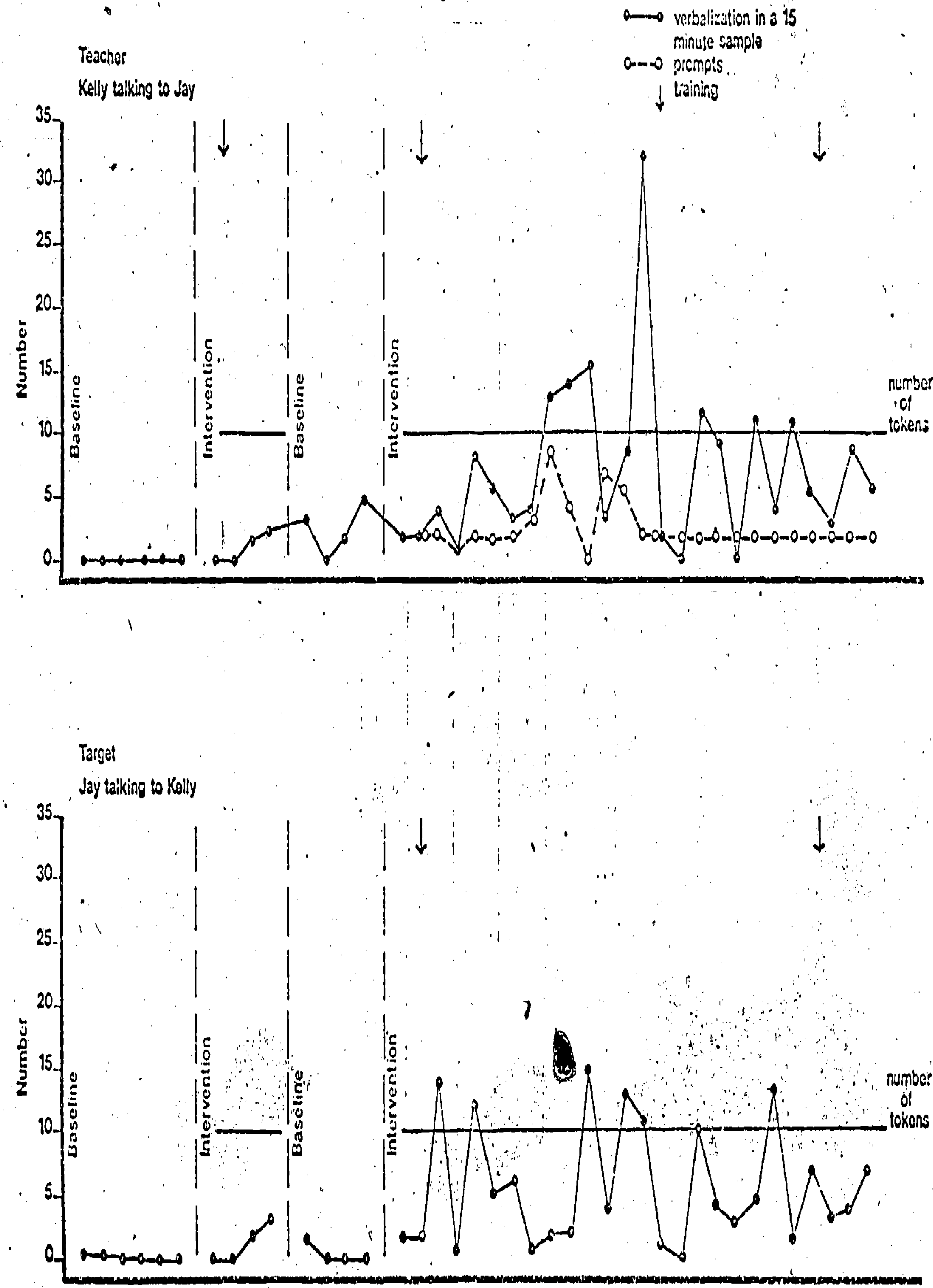







Figure 1

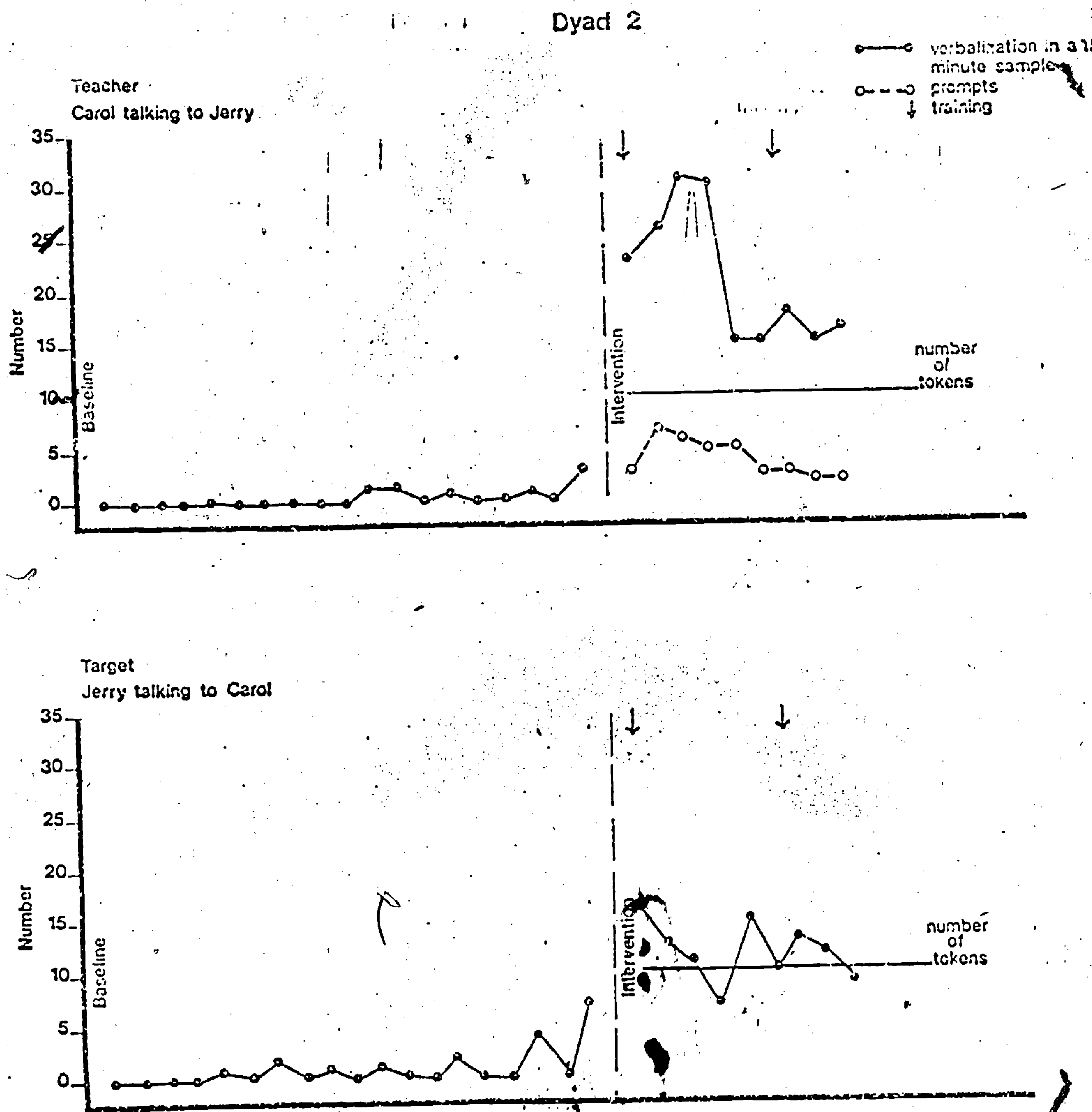
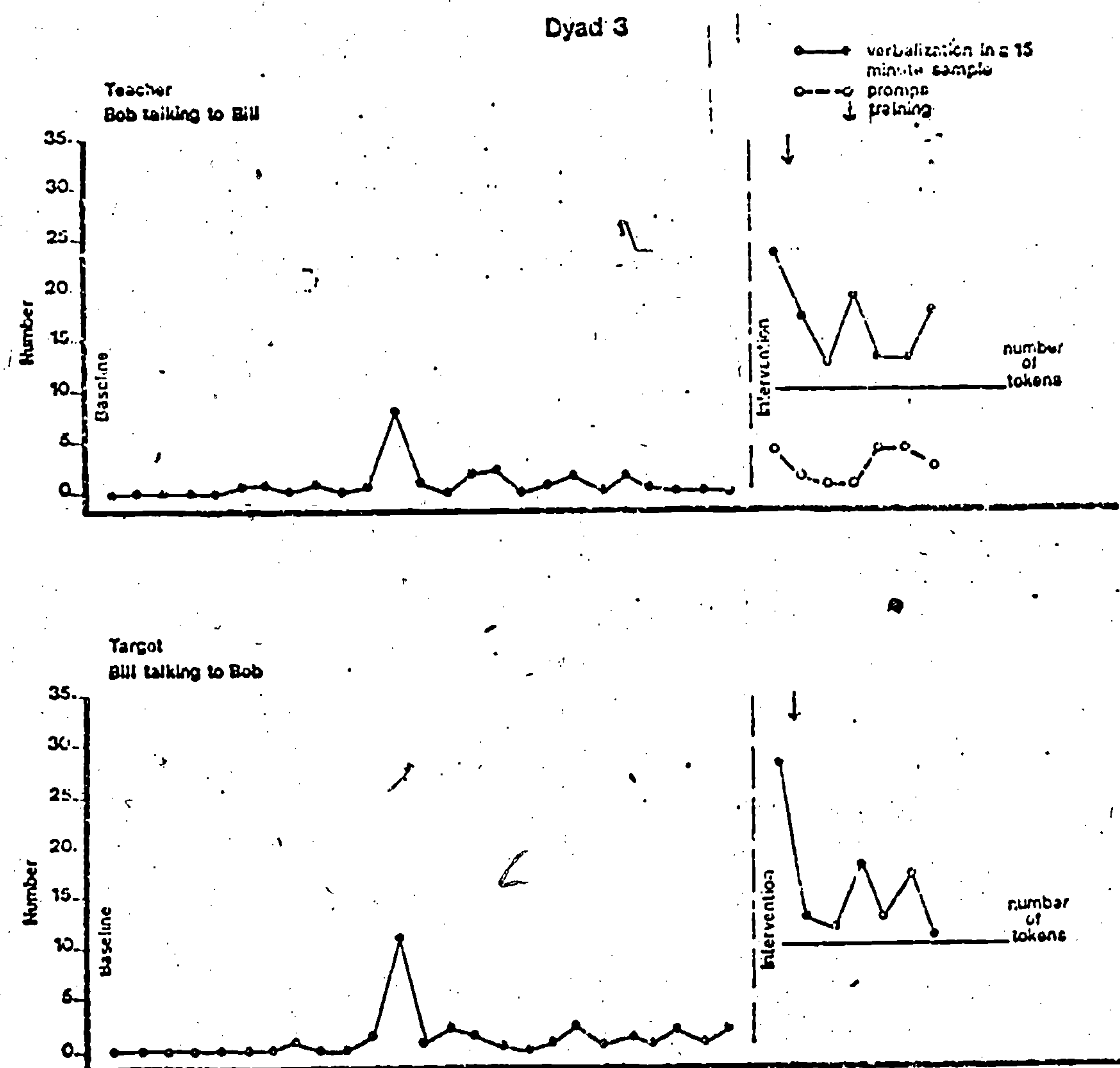

Dyad 2
verbalization in a 1 minute sample
prompts
training
Teacher
Carol talking to Jerry
35
30
25
20
15
10
5
0
Number
Baseline
Intervention
number of tokens
Target
Jerry talking to Carol
35
30
25
20
15
10
5
0
Number
Baseline
Intervention
number of tokens

Figure 2



Dyad 3
verbalization in a 15 minute sample
prompts
training
Teacher
Bob talking to Bill
Number
Baseline
Intervention
number of tokens
35.
30.
25.
20.
15.
10.
5.
0.
Target
Bill talking to Bob
Number
Baseline
Intervention
number of tokens




Figure 3

Teaching Preschool Teachers to Request Verbalizations
from Developmentally Disabled Children

Thomas M. Longhurst and Deborah Shank-Andersen

Kansas State University

Preliminary observations of a classroom of moderate to severely developmentally disabled preschoolers suggested that the children seldom made verbal responses. The children were being trained to make verbal responses, their parents reported that they occasionally would say words, and the children occasionally did make a few verbal responses in the classroom, usually in response to a specific request by the teachers.

This investigation was undertaken to determine how often a group of preschool teachers ~~requested verbal~~ responses from their students and how often the students responded with verbalizations to their requests. Further, it was designed to see if the rate of requests for verbalizations could be increased, and if there would then be a corresponding increase in the verbalization rates of the students.

Methods

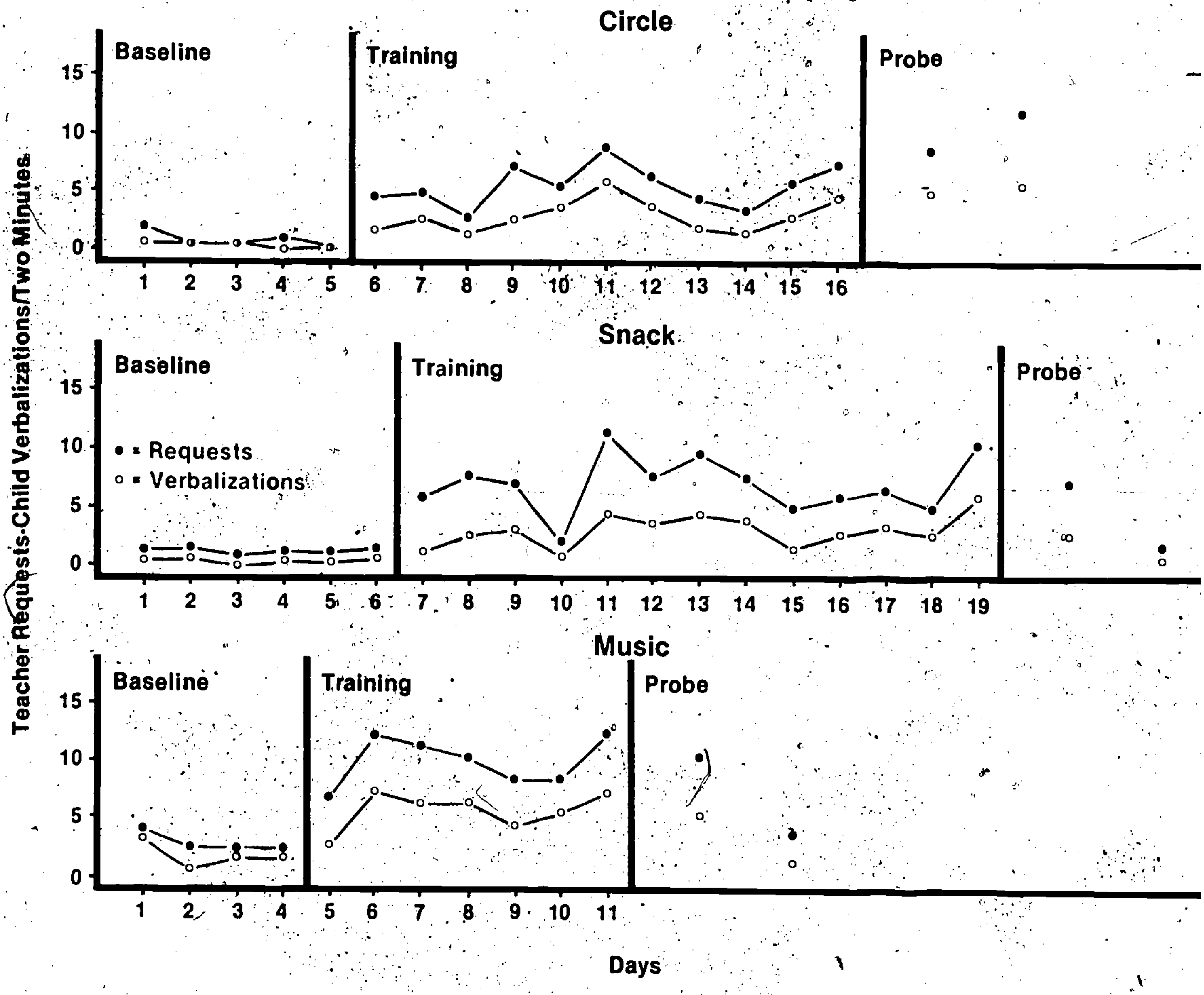
Subjects were three teachers and nine moderately to severely developmentally disabled preschoolers. Teacher-child verbalizations were recorded over a 12-week period in three group interaction situations: circle, snack, and music. A request for verbalization was defined as any question from the teachers (excluding yes-no questions) that required a verbal response or a specific request that the child make a verbal response. During baseline and training there were 2-3, 16-10 min observations each week. A 20-min probe observation was conducted four weeks after training concluded and again at six weeks. Beginning in the third week, after baselines were stabilized, teacher training began. Training consisted of weekly staff meetings in which each student's speech and language training progress and records of verbalizations at home and school were reviewed. Specific instructions on how and when to ask for verbal responses were given, and the teachers role-played requests for verbalizations and responses. Samples of tape recordings of teacher-child interactions were played and critiqued. On day 11 during snack period, the experiment provided an in-class demonstration. After four weeks, the reviews and role playing were discontinued. After an additional four weeks and again at six weeks, probes of teacher interactions were collected by making tape recordings of teachers during snack, circle, and music. The teachers were accustomed to their classroom interactions being tape recorded as part of an ongoing research project. The probe recordings were probably typical samples of teachers' verbalizations.

Results

Examination of the baseline data suggested that teachers averaged about one request for verbalization per 2 min in circle and snack, and about three per 2 min in music. When training was initiated, requests for verbalization increased to five-six requests per minutes in circle and snack, and about 10 per 2 min in music. When a noticable decrease in request rate was noted on day 10 of snack, a classroom demonstration was made which resulted in a marked increase on subsequent days. Child verbalizations showed a corresponding increase with an average of about three responses per 2 min in circle and snack, and about six per 2 min in music. Probes during circle showed a further increase in requests and verbalizations at four and six weeks after training. Both snack and music showed rates comparable to training levels at four weeks but a considerable decrease at the six week probe.

Discussion

Three teachers were successfully trained to request child verbalizations at a higher rate, resulting in a corresponding increase in student verbal responses. The training effects were maintained during probe observations conducted four weeks after training was completed. Teacher rates of requests during circle were at the highest levels at the six week probe. Probes during snack and music showed a decrease in requests at six weeks. Informal observations after six weeks suggested that the training effect was maintained in circle, but decreased to baseline levels in snack and music.


Circle
Baseline
Training
Probe
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Snack
Baseline
Training
Probe
• = Requests
○ = Verbalizations
19
Music
Baseline
Training
Probe
Teacher Requests-Child Verbalizations/Two Minutes
Days

# Increasing Questions to Retarded Children: An Analysis of Multiple Effects

Steven F. Warren and Patrick Rimell

Kansas Neurological Institute

and

University of Kansas

Increasing Questions to Retarded Children: An Analysis of Multiple Effects. Steven F. Warren and Patrick Rimell

The intent of this study was to measure the multiple effects of a treatment intervention on the verbal repertoire of three institutionalized severely retarded children. Normally, a behavior analyst might institute several modifications generally identified as components of an incidental teaching procedure when the therapeutic goal is to increase the child's verbal repertoire. However, for purposes of experimental rigor, only a single potentially powerful teacher behavior, question-asking, was increased in a multiple baseline design across the three subjects. The verbal behavior of the subjects was coded into 17 response categories and the teacher verbal consequences were coded into 13 response categories, to allow an analysis of multiple response effects of the intervention.

The purpose of the research was twofold: 1) to further contribute to the research on behavior covariations and side effects in general, and 2) to provide an analysis of the multiple (positive and negative) effects which might be expected to result from this specific type of therapeutic intervention.

All three subjects were observed for a 15-min period daily in their classroom during an academic training period. All verbalizations made by the subjects and to them from their teachers were recorded and then coded into response categories. Subject antecedents were coded as statements, mands, instructions, greetings, etc. Teacher consequences were coded as positive feedback, prompts, etc. The primary definition of a teacher consequence was that it immediately followed an utterance by the subject.

The rate of non-yes/no question asking for the teachers increased very substantially as a result of the intervention for all three subjects. Subsequentially, the rate of child answers also increased substantially across the three subjects. These target effects allowed for an analysis of possible response class effects (covariations). Correlational analyses were conducted between teacher question asking and all other coded teacher behavior. Likewise, correlational analyses were also run between child answers and all other types of child verbal behaviors. Some correlations were found at the .01 level of confidence during the intervention. These are shown in the attached table. They represent the only evidence of response class generalization (natural covariations) found in the study.

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Insert Table 1 about here

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The correlations reported in this table show multiple effects which appeared to result from the intervention. These findings are briefly considered in terms of desirability, causality, generality, predictability, strength, durability, and magnitude.

In terms of desirability, two obvious desirable changes occurred for Teacher 2 in her behavior to Subject 2 - general positives increased and general negative decreased. Child statements covaried for all three subjects and mands covaried for two of the subjects. These could be considered potentially undesirable only because these types of responses are valuable in the children's repertoires. Other correlations found could not be judged as representing either particularly desirable and undesirable effects.

It was not possible to demonstrate causality because a moment-by-moment analysis of response relationships was not possible to conduct. Thus, only speculation was possible. There is a striking lack of generality in the effects across subjects and responses that covaried. The responses which were found to covary were not logically predictable and while some logical covariations that might have been predicted to occur were not found. The covariations found were strong (at the .01 level) but their durability was uncertain.

In terms of magnitude, the multiple effects found seemed relatively weak and certainly presented no cause for alarm. They would not have been easily noticed if they have not been specifically observed for.

The results of this study generally support the position that while unintended and unexpected side effects may occur as the result of a behavior modification, the desirability, causality, strength, durability, generality, and predictability of these effects are of a capricious nature. Furthermore, increasing questions to mentally retarded children in the manner used in the study seemed to be therapeutically beneficial. It is likely to facilitate increased learning by the children and to increase verbal responsiveness and interaction between the child and teacher. Some minor or unintended effects may occur, but generally the benefits of the procedure should be those intended. Stronger therapeutic effects may occur when the modificaiton is used as a primary component in an incidental teaching approach, which would combine its effects with those achieved by systematic modeling and reinforcement of target behaviors.

Correlations Significant at the .01 Level

The correlation coefficient is shown in parentheses.

| | Subject 1 (Teacher A) | Subject 2 (Teacher A) | Subject 3 (Teacher B) |
|---|---|---|---|
| **Consequences Correlated with Teacher Questions:** | | | |
| Positive Correlations | ---- | General Positives (.66) | --- |
| Negative Correlations | Yes/No Questions (.64)<br>Mands (.60)<br>Instructions (.56) | General Negatives (.75)<br>Mands (.77) | --- |

| | Subject 1 | Subject 2 | Subject 3 |
|---|---|---|---|
| **Responses Correlated with Subject Answer Combinations:** | | | |
| Positive Correlations | --- | --- | --- |
| Negative Correlations | Question/Mand (.67)<br>Statements (.56) | Question/Mand (.51)<br>Statements (.75) | No Answers (.73)<br>Statements (.52) |

# Normal and Delayed Language Development: A Quantitative Analysis

Ralph McQuarter, Ann Rogers-Warren,

and Steven F. Warren

University of Kansas

This paper was presented at the 87th Annual Convention of the American Psychological Association in New York, Sept. 4, 1979.

## Introduction

The topic of mainstreaming has become a focal one among educators of handicapped children during the past several years. A primary assumption of the mainstreaming movement is that the handicapped child will benefit from observing and interacting with normal children in the mainstreamed classroom. Although research has been increasing, the bases for mainstreaming have relied more on theoretical assumptions than on empirical research. The purpose of the study reported here was to investigate some questions concerning the effects of mainstreaming on the productive verbal behavior of language delayed preschool children and their nonhandicapped peers in a mainstreamed classroom. We were specifically interested in the following questions:

1) How do normal and language delayed preschool children compare in terms of their respective verbalization rates, their rates of spontaneous speech initiation, and their responsiveness to questions from peers and teachers?
2) How do teachers respond to the two types of children in terms of their rates of instructions, questions, and total verbalizations?
3) How do normal child models compare to other normal children not in a mainstreamed classroom in ~~in~~terms of their relative ratios of peer-to-teacher interaction?

These questions were investigated in a study of 10 language dealyed preschool children who were mainstreamed in a classroom with 5 normal models. Five normal children from a regular non-mainstreamed classroom were also observed in order to contrast the behavior of the normals in the mainstreamed classroom to normals in a traditional classroom. All 20 children were matched for age with a mean of 3 yr, 10 months. The language-delayed children all showed up on a battery of standardized language assessments as having speech delays averaging about 1 yr below their age levels. All 20 were observed for 10 15-min periods across 3 months. The observations were taken while the children were involved in a freeplay period with a teacher-pupil ratio of 1 to 5. The observation code measured child verbalizations to peers and teachers with a sub-category for spontaneous initiations and verbal responses to questions (non-prompted) and also measured questions, instructions, and total verbalizations by the teachers in both the mainstreaming classroom and the traditional classroom.

Not surprisingly, the normal models in the mainstreamed classroom displayed much higher rates of spontaneous initiations and total verbalizations than the language delayed children as shown in Table 1.

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Insert Table 1 about here

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The language delayed children also responded to questions from their teachers at a much lower percentage of time compared to their normal peer models (i.e., less responsive in obligatory speech situations) as shown in Table 2. However, rates of teacher verbalizations to both types of children in the mainstreamed classroom were very similar in terms of their

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Insert Table 2 about here

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total verbalizations, questions and instructions to each group. Further, these rates were very similar to the rates displayed by teachers in the normal children's classroom. Also, the normal children in the traditional classroom displayed rates of verbal behavior very similar to the rates displayed by the normal models in the mainstreaming classroom. But an important difference was found between the verbal behavior of the mainstream models and their counterparts in the traditional classroom. This difference is displayed in Table 3. It shows that the normal children from the

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Insert Table 3 about here

---

traditional classroom directed a far greater percentage of their total verbalizations to their peers than did the language delayed or normal children in the mainstreaming classroom. The children in the mainstreaming classroom interacted much more with their teachers than with each other compared to the children in the normal classroom during the freeplay periods observed.

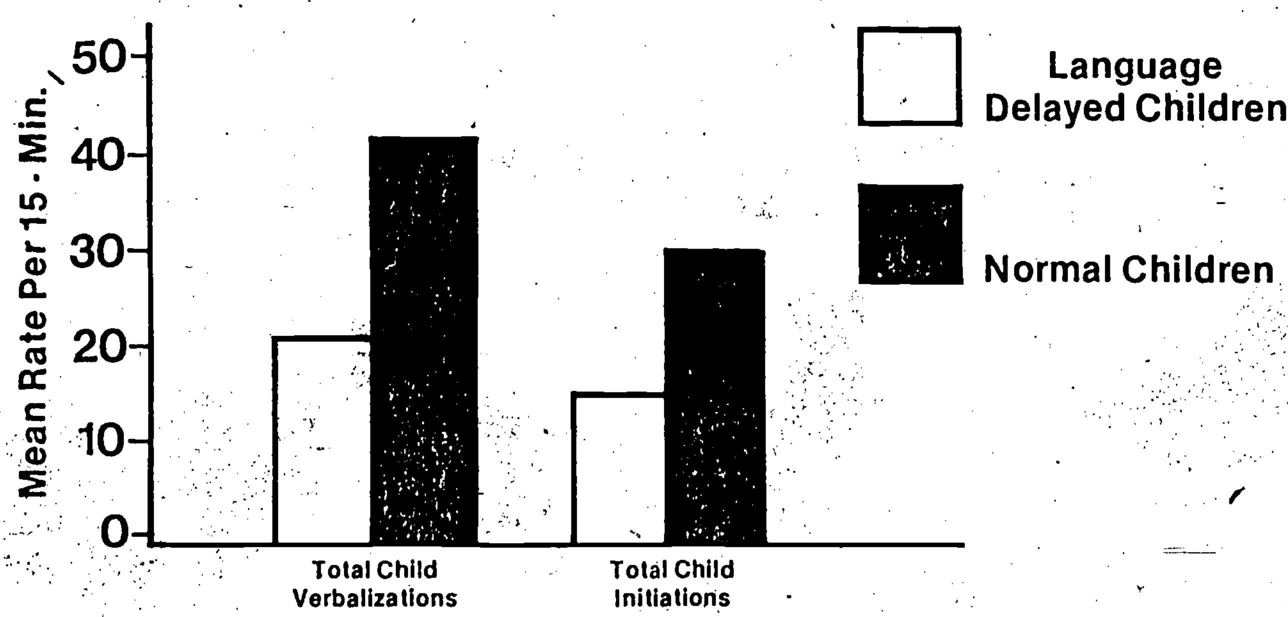
## Discussion

The mainstreaming model examined here has been characterized by educators as "reverse mainstreaming......." the presence of normal children in a classroom primarily made up of handicapped children. Contrary to the hopes and expectations of advocates of this model, it may have some effects in reverse of those intended, however. The assumption that normal children serve as important models for handicapped children is suspect when social interaction between the two is infrequent. In this study the normal models talked primarily to the teachers and relatively infrequently to their handicapped peers. A further analysis of the data revealed they directed a disproportionate amount of what peer interactions they made to each other, thus forming what in some ways amounted to a separate sub-group within the class.

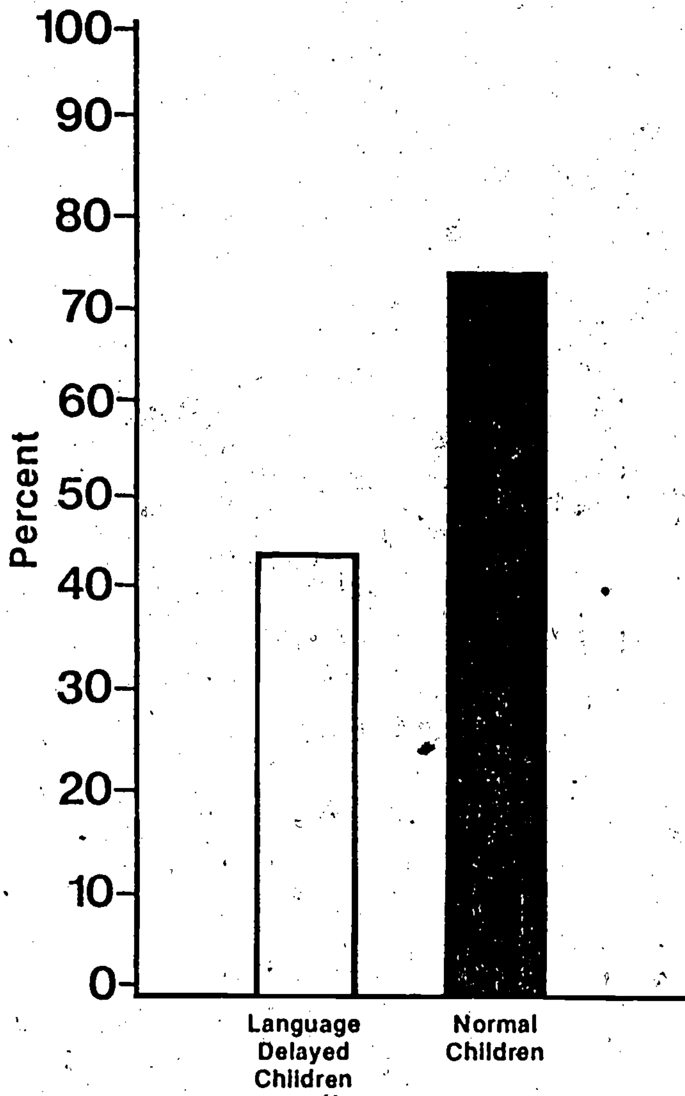
Thus, their true therapeutic function remains to be established. Further research on the effects of different ratios of handicapped to non-handicapped children and the effects of different characteristics of the groups remains to be done since these effects may be typical of only this specific mainstreaming model and the population characteristics of these subjects.

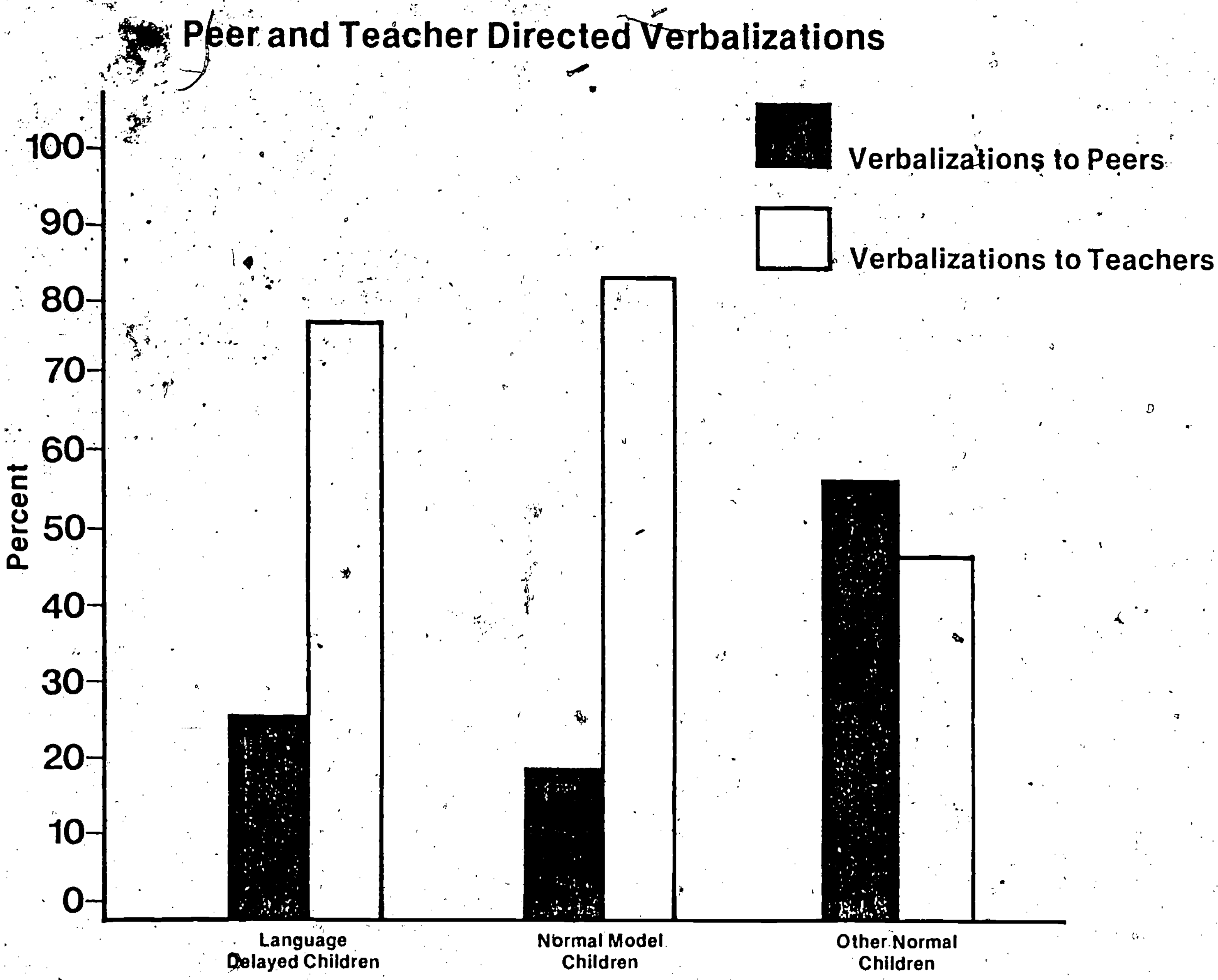
The differences between the normal models and their language delayed peers in terms of rates of all verbalizations, spontaneous initiations, and responsiveness to questions may have some interesting implications for assessment and treatment of these children. These differences support arguments that have posited speech rates to be a primary predictor of delay and also those which have suggested that rate of social interaction should be a primary treatment target in comprehensive language training efforts. Currently, the rate and functionality of social speech are often ignored in deference to an emphasis on training the syntactic and semantic structure of language. However, it has recently been argued that if rate is increased sufficiently, structural complexity will also develop accordingly.

Rate of Child Verbalizations



# Percent Responsive to Questions




Peer and Teacher Directed Verbalizations
Verbalizations to Peers
Verbalizations to Teachers
Percent
100
90
80
70
60
50
40
30
20
10
0
Language Delayed Children
Normal Model Children
Other Normal Children

# Time Delay: A Technique to Increase Language Use and Facilitate Generalization in Retarded Children

James Halle, Ann Marshall, and Joseph E. Spradlin

Kansas Neurological Institute

and

University of Kansas

## Introduction

The present investigation occurred in an institutional environment that lacked opportunities for functional speech in a most obvious setting: mealtime. Although the retarded residents who served as subjects were language delayed, the dining environment inhibited their use of speech. Thus, this investigation was designed to answer the following questions: (1) was an environmental manipulation, in the form of a time delay, a sufficient stimulus to elicit a meal request; and if not, (2) once trained to request breakfast, was the time delay a sufficient stimulus event to obtain generalization to a second mealtime when no training occurred?

## Method

### Subjects

Six severely retarded children who resided at a state institution were studied (see table of subject characteristics).

### Setting

This study was conducted five days a week during breakfast and lunch in the central dining area of the institution. Each ward was assigned its own dining room within this facility. Food trays were dispensed in the following way: a staff member called the child, who then walked to the counter, picked up the tray, and returned to a dining table. Verbal behavior had not been required for the children to receive their trays.

### Procedures

The procedures consisted of three major conditions: baseline, a 15-sec delay, and a delay and modeling procedure. During the baseline condition, nothing in the natural environment was altered, except that the staff member who called the children to the counter became an observer and recorded what the children said. The food trays were placed on the counter, the child's name was called, and everyone waited until that child picked up the tray and returned to a dining table.

<u>15-Sec Delay</u> - The first experimental procedure applied was a 15-sec delay. In this condition, when the child reached the counter, the staff member held the child's tray for 15 sec, or until the child made a meal request. Any request was reinforced by immediate presentation of the food tray. If no request, or only an incorrect request occurred, the tray was handed to the child at the end of the 15-sec delay.

<u>Modeling</u> - If the child did not begin requesting the meal during the 15-sec delay condition, a second experimental procedure was initiated. At the end of the 15-sec delay, the staff member modeled the response ("tray, please"). If the child imitated the model, he immediately received the tray. If not, after 5 seconds the same phrase was repeated. If again no response, or only an incorrect response occurred, a third and final model was provided. The child was allowed 15 seconds after this final model to respond with an imitation (or any acceptable meal request). If none occurred, the child was given the tray at the end of this final 15 seconds.

Three probes for generalization were administered. To assess generalization across settings, the lunch meal was monitored throughout the study. The procedures used at lunch were the same as those used at breakfast in the baseline condition: trays were placed on the counter and the children needed only to pick them up and return to their seats.

Probes for generalization across people were also administered. Five of the six subjects were probed on random days at both breakfast and lunch by a person other than the trainer. This person (sometimes familiar, sometimes a stranger) would stand behind the counter, call the child's name, and hold the tray for 15 seconds or until a meal request was made. If no request occurred, the tray was handed to the child at the end of the 15-sec period.

Two further probes occurred on the last two days of the study. These were probes for generalization across settings and people. Only four subjects received these probes, two had been transferred to other wards within the institution. These probes consisted of an evening staff person calling the children to the counter, holding their trays, and waiting 15 seconds or until an appropriate response was emitted at the supper meal.

## Results

Figure 1 displays the meal requests of three subjects. All required training at breakfast before making meal requests with any consistency at that meal. The 15-sec delay did not result in an increase in requesting in any subject, except Jess who requested breakfast during the delay only twice in 15 meals. Prior to the time the subjects were responding with meal requests at breakfast, when the delayed was introduced at lunch, it exerted no control (i.e., no lunch requests occurred). However, once two consecutive responses occurred at breakfast, the introduction of only the 15-sec delay at lunch was sufficient to obtain generalization of meal requesting to this second meal for all three subjects.

The three remaining subjects' meal requests are presented in Figure 2. These subjects had the opportunity to observe the training that occurred with the first pair of children. All three demonstrated an immediate increase in requesting at both breakfast and lunch when the 15-sec delay was introduced. Simply the provision of an opportunity to respond was a sufficent stimulus to elicit many meal requests from these subjects.

Once the subjects were requesting their meals at breakfast, all six requested them on the first day that the 15-sec delay was introduced at lunch.

Generalization across people was assessed for five subjects. Eighteen probes were administered, seven occurred at breakfast and 11 at lunch. Three of the children were successful on all probes. Danny, who received only one probe, failed to respond at breakfast to a strange prober; and Stephen, who was successful on four other probes, failed to make a complete request at lunch to a familiar prober.

Generalization across both settings and people was assessed for four subjects. Joel, Danny, and Betty requested their supper meals during the delay on both of the occasions that the prober used the delay procedure. Jess received only one supper probe (he was on a home visit when the first probe was administered); he failed to make a meal request within the 15-sec period.

## Discussion

The introduction of a 15-sec delay at mealtime promoted speech in three subjects, and facilitated generalization in three others. This difference may reflect the order in which subjects were trained. The three subjects (Betty, Kit, and Danny) in whom the delay alone promoted speech, had observed the first two subjects (Stephen and Jess) undergo modeling training. Vicarious learning of some kind could well have occurred. "Tray, please" was frequently modeled by the trainer and imitated by the two subjects being trained. Three of the four subjects who received the 15-sec delay after the first pair was trained, responded to the delay alone. Only Joel, the subject with the lowest verbal skills, did not respond to the delay. It is also possible that the three subjects who responded to the delay had the target response in their repertoires, and needed only the opportunity to respond.

Apparently it was the 15-sec delay itself, or the withheld tray and not the person or setting that controlled the responding of the subjects. Six adults, in addition to the original trainer, participated in probing with the 15-sec delay, and two of these six were complete strangers, yet there was no evidence of differential responding to the probers. The same situation held true for different settings. That is, whether the meal was breakfast, lunch, or supper appears irrelevant. When the delay was introduced, meal requests occurred if the response was within the child's repertoire and if it was under appropriate stimulus control.

Anecdotal (less formal) data were taken in two other situations to assess further the generality of the delay technique's effects. One situation was at lunch after the first serving was consumed. Second portions and desserts were then dispensed by means of the 15-sec delay procedure. The delay elicited responses like "I want cake," "cake, please," "I want dessert, please," and "I want berries." Freeplay constituted the second situation in which the delay was assessed for its controlling properties. In this setting, Betty said, "I want comb," and when one of the experimenters withheld a cup of popcorn from Jess, he replied, "popcorn, please." Thus, these subjects seemed to know the structure and function of the requests, but other examples showed that they lacked command of some of the nouns to place within the structure. For example, requests like "I want (blank)," where blank was unintelligible, and "(blank), please" occurred. It should be noted that the delay did not always elicit a request in these two situations, but there was evidence of generalized requesting.

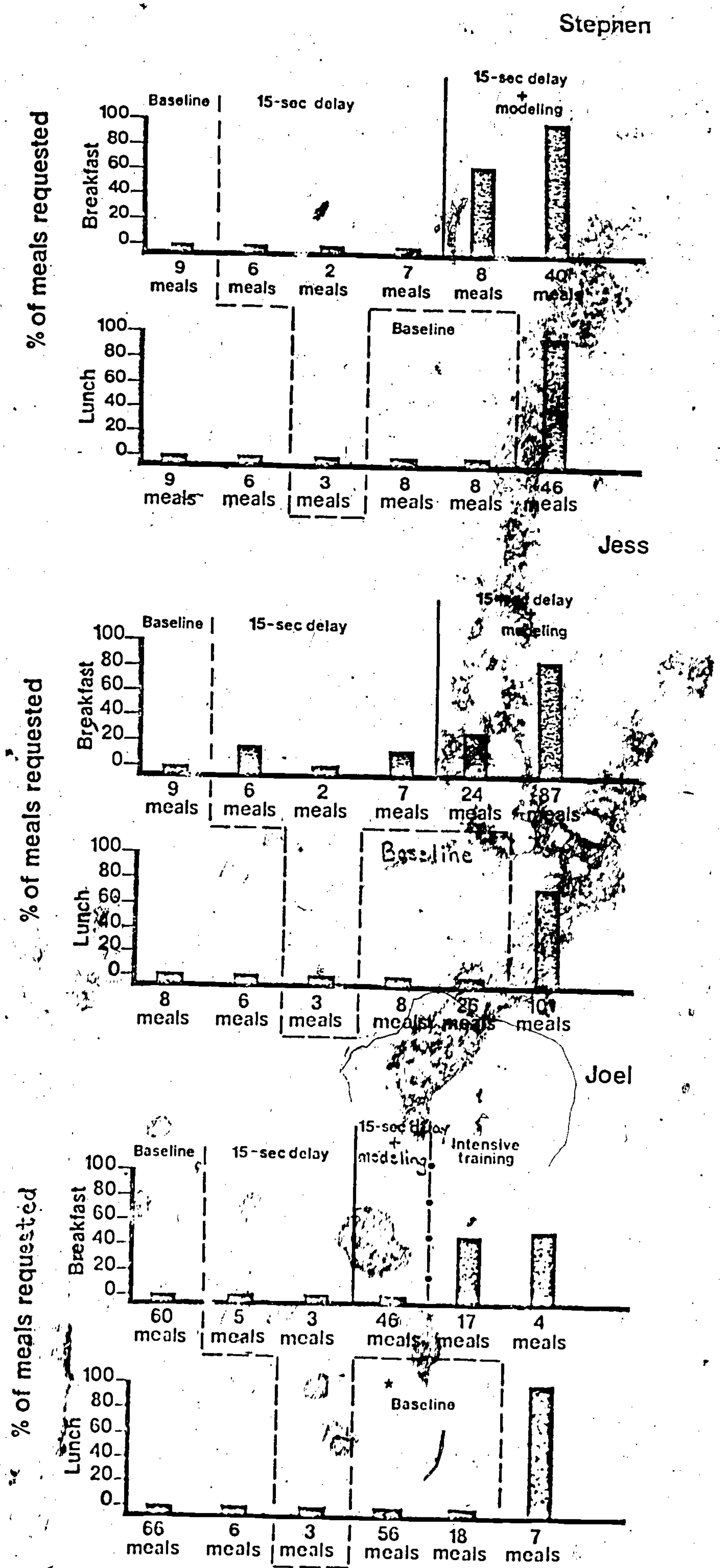
In summary, the delay technique was used as 1) an evoking device for subjects who already knew the target response, and 2) as a generalization-facilitating technique for subjects who required training on the target response. A delay technique, such as that used in the present study, could serve as an early evoking device for all generalization-facilitating programs involving requests. Prior to making a manipulation, a delay could be introduced to assess the present strength of the response under normal conditions. In this way, preempting of potential generalization could be avoided. A time delay is a simple, yet powerful method of manipulating the environment to increase opportunities for verbal responding.

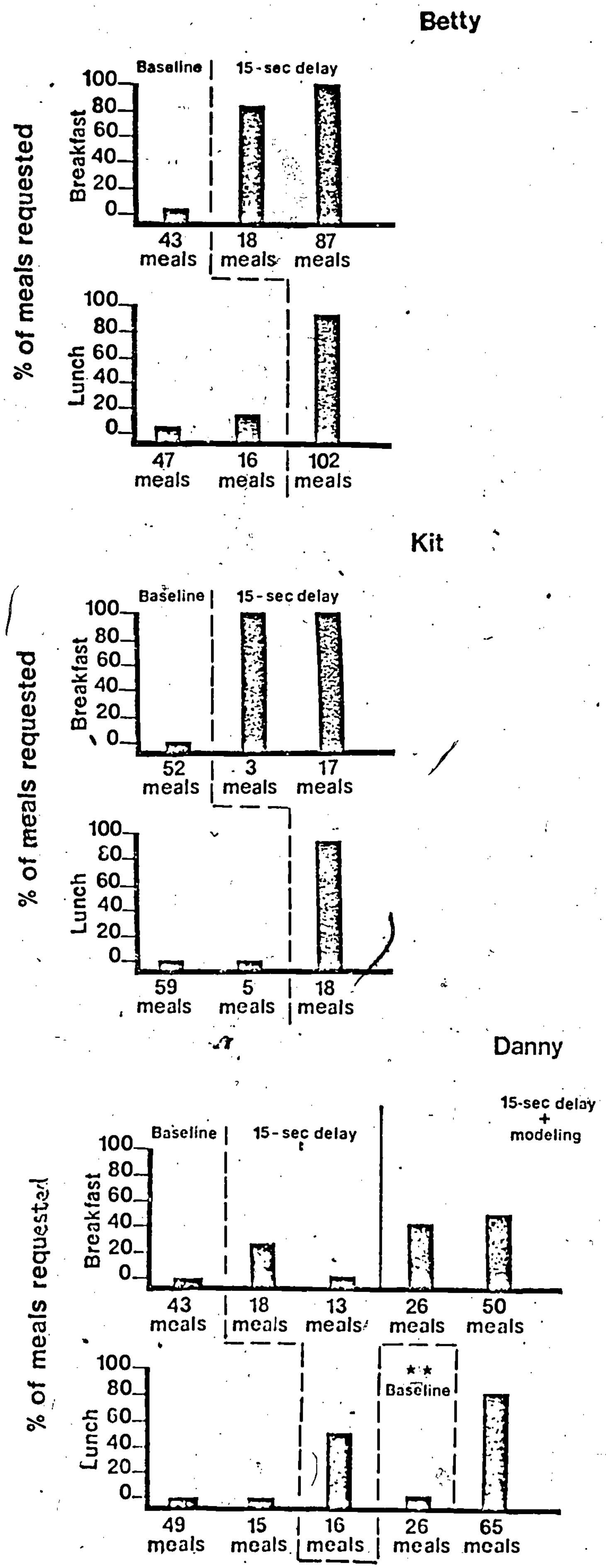
Table 1

SUBJECT CHARACTERISTICS

| NAME | SEX | CA | MI[a] | AB[b] | LENGTH OF INSTITUTIONALIZATION |
|---|---|---|---|---|---|
| STEPHEN | M | 12-4 | SEVERE | MODERATE | 5-4 |
| JESS | M | 11-10 | PROFOUND | SEVERE | 3-8 |
| JOEL | M | 14-9 | PROFOUND | PROF/SEV | 5-4 |
| BETTY | F | 13-2 | PROFOUND | SEVERE | 6-11 |
| KIT | M | 15-7 | PROFOUND | SEVERE | 4-10 |
| DANNY | M | 14-5 | PROFOUND | SEVERE | 6-5 |

[a]Measured Intelligence
[b]Adaptive Behavior


Stephen
% of meals requested
Breakfast
Lunch
Baseline
15-sec delay
15-sec delay + modeling
100
80
60
40
20
0
9 meals
6 meals
2 meals
7 meals
8 meals
40 meals
9 meals
6 meals
3 meals
8 meals
8 meals
46 meals
Jess
% of meals requested
Breakfast
Lunch
Baseline
15-sec delay
15-sec delay + modeling
9 meals
6 meals
2 meals
7 meals
24 meals
87 meals
8 meals
6 meals
3 meals
8 meals
26 meals
101 meals
Joel
% of meals requested
Breakfast
Lunch
Baseline
15-sec delay
15-sec delay + modeling
Intensive training
60 meals
5 meals
3 meals
46 meals
17 meals
4 meals
66 meals
6 meals
3 meals
56 meals
18 meals
7 meals


Betty
Baseline
15-sec delay
% of meals requested
Breakfast
Lunch
100
80
60
40
20
0
43 meals
18 meals
87 meals
47 meals
16 meals
102 meals
Kit
Baseline
15-sec delay
% of meals requested
Breakfast
Lunch
52 meals
3 meals
17 meals
59 meals
5 meals
18 meals
Danny
Baseline
15-sec delay
15-sec delay + modeling
% of meals requested
Breakfast
Lunch
43 meals
18 meals
13 meals
26 meals
50 meals
★★ Baseline
49 meals
15 meals
16 meals
26 meals
65 meals

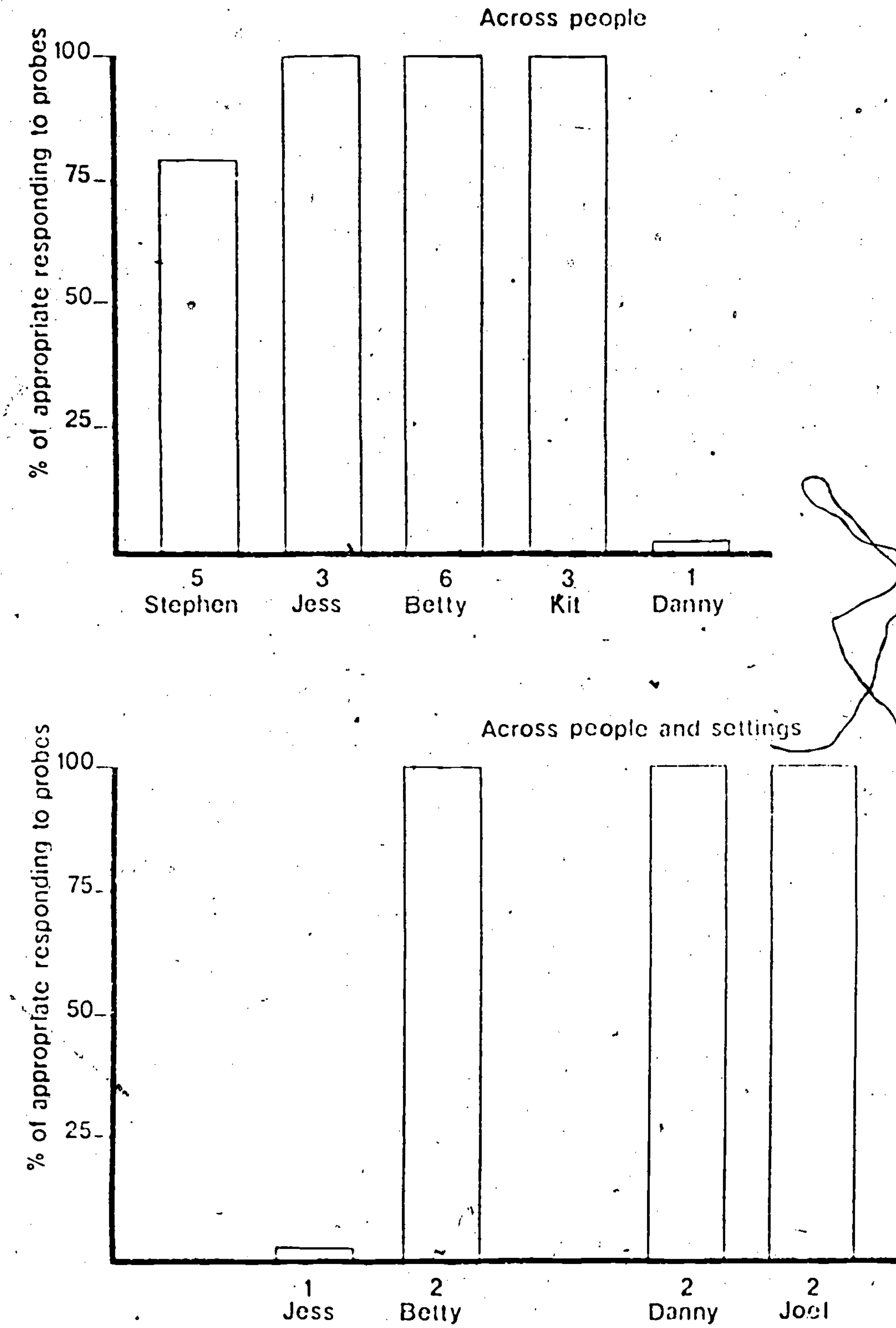

Across people
% of appropriate responding to probes
100
75
50
25
5 Stephen
3 Jess
6 Betty
3 Kit
1 Danny
Across people and settings
% of appropriate responding to probes
100
75
50
25
1 Jess
2 Betty
2 Danny
2 Joel

Figure 3.

# Mands for Verbalization: Facilitating the Display of Newly-Trained Language in Children

Ann Rogers-Warren and Steven F. Warren

Language Project Preschool

University of Kansas

The present study investigated a procedure to facilitate the classroom use of language taught to subjects in one-to-one training sessions. This procedure, termed the mand-model technique, is a version of the incidental teaching procedure developed by Hart and Risley (1968, 1974, 1975). The incidental teaching procedure has been shown to facilitate language development in disadvantaged (culturally deprived/low socio-economic) preschool children. The mand-model technique employed here was a simplified version of the Hart-Risley procedure designed for children who did not typically initiate interactions with adults and other children.

Three children, two boys and one girl, enrolled in a university preschool for language-deficient children served as subjects. All three children received specific language training each preschool day for approximately 20 minutes. Individual training sessions were conducted in small rooms adjacent to the classroom. Four classroom teachers participated in the study: two undergraduate students in child development, one graduate student with two years teaching experience, and the senior author.

One 15-min sample of each target child's language behavior was collected daily, Monday through Thursday, while the children engaged in free-play. The observation system used required two trained observers. The first observer made a word-by-word "verbatim" transcript of the child's utterances, generally following the procedures outlined by Schiefelbusch (1963). Using a behavioral observation code, the second observer recorded instances of teacher questions, mands (instructions for verbalizations), and models for verbalizations preceding the child's verbalizations, as well as occurrences of specific praise for verbalization following the child's speech. The observer also recorded in the same sequence whether the child made an appropriate verbal response (obligatory response) to any questions, mands, or models, and recorded the occurrence of any other child verbalizations, indicating if they were teacher or peer directed.

Following baseline assessments of child and teacher rates of language, teachers were trained to use mands, models, and contingent praise for verbalization in two practice sessions before the intervention was instituted in the classroom. Role playing with feedback about the appropriateness of the mands, models, and praise for verbalizations, and suggestions about the form of mands and models were provided to the teachers. Throughout the intervention, teachers counted their daily use of mands, models, and praise for language display, and displayed their data on graphs in the preschool area.

When the mand-model technique was introduced in multiple-baseline fashion across the three subjects, teachers increased their mands and models as shown in Figure 1. Subsequent increases in the rates of the children's

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Insert Figure 1 about here

---

verbalizations were seen. As shown in Figure 2, Bob had averaged about 11 verbalizations during each baseline observation. Following the intervention,

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Insert Figure 2 about here

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his rate of verbalization increased to an average of 44 per session. Mark's verbalizations increased from an average of 13 to an average of 29 per session. Mark's rate of verbalization accelerated as the intervention continued. During baseline, Sue verbalized an average of 19 times during each observation; during the intervention she averaged 37 verbalizations.

Follow-up data were collected for Bob and Mark during the following fall semester (approximately four months after the intervention phase was completed). These data demonstrated that increases in rates of verbalization were maintained after the intervention was discontinued. No follow-up data were available for Sue who left the preschool program at the end of the term.

In addition to the primary rate increases produced by the intervention procedure, three other changes in child verbalizations were documented. First, the overall responsiveness of the subjects to adult verbalizations increased (see Table 2). During the intervention, many more obligatory

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Insert Table 2 about here

---

response occasions were presented to the target children, the children responded much more frequently, and their response rates more closely resembled those of their peers. Second, for all three subjects, generalization of forms and structures taught in one-to-one training increased during the mand-model procedure. These results are shown in Figures 3, 4, and 5.

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Insert Figures 3, 4, & 5 about here

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Finally, each child showed increases in vocabulary and complexity of utterances in addition to the increased generalization from training. Figure 6 shows the cumulative novel words and forms during baseline and intervention conditions for all three subjects.

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Insert Figure 6 about here

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In summary, the results of this study provide a systematic extension and independent confirmation of the general incidental teaching approach with two severely and one moderately language-delayed subjects. The specific technique used here, the mand-model procedure, both facilitated the effects of one-to-one language training and acted to enhance language development directly. Further extensions of this approach to treat problems of handicapped persons is desirable.

Figure Captions.

Figure 1. Mean rate of teacher mands, models, and specific praise for language display during baseline and intervention conditions.

Figure 2. Total verbalizations by each subject during 15-min observations are shown by points connected by the solid line. Mean verbalization rate per condition for each subject is shown by the solid horizontal lines. Mean verbalization rates during follow-up observations for Bob and Mark are shown by the solid bars at the right of their graphs. Continuous follow-up observations were implemented four months after the intervention and continued for three months. Each bar represents the mean for one month (approximately 15 observations) of the follow-up.

Figure 3. Cumulative number of novel nouns displayed by Mark in the classroom are represented by the open triangles connected by the solid line. The dark solid bar background indicates the number of these noun forms Mark was being trained on in relation to the number displayed in the classroom.

Figure 4. Cumulative number of novel "nominal-verb-(article)- noun" forms displayed by Bob in the classroom are represented by the open triangles connected by the solid line. The dark solid bar background indicates the number of these phrase forms Bob was trained on in relation to the number displayed in the classroom.

Figure 5. Cumulative number of novel "nominal-verb-(modifier) (preposition)-noun" forms displayed by Sue in the classroom are represented by the open triangles connected by the solid line. The dark solid

bar in the background indicates the number of these phrase forms Sue was being trained on in relation to the number displayed in the classroom.

Figure 6. Cumulative new words and new phrases for Bob, Mark and Sue during each classroom observation are represented by points connected by the solid line. The solid, straight lines on each graph represents the rate of new word display or new phrase display predicted by subjects' baselines on the basis of a least-squares best fit straight line analysis.

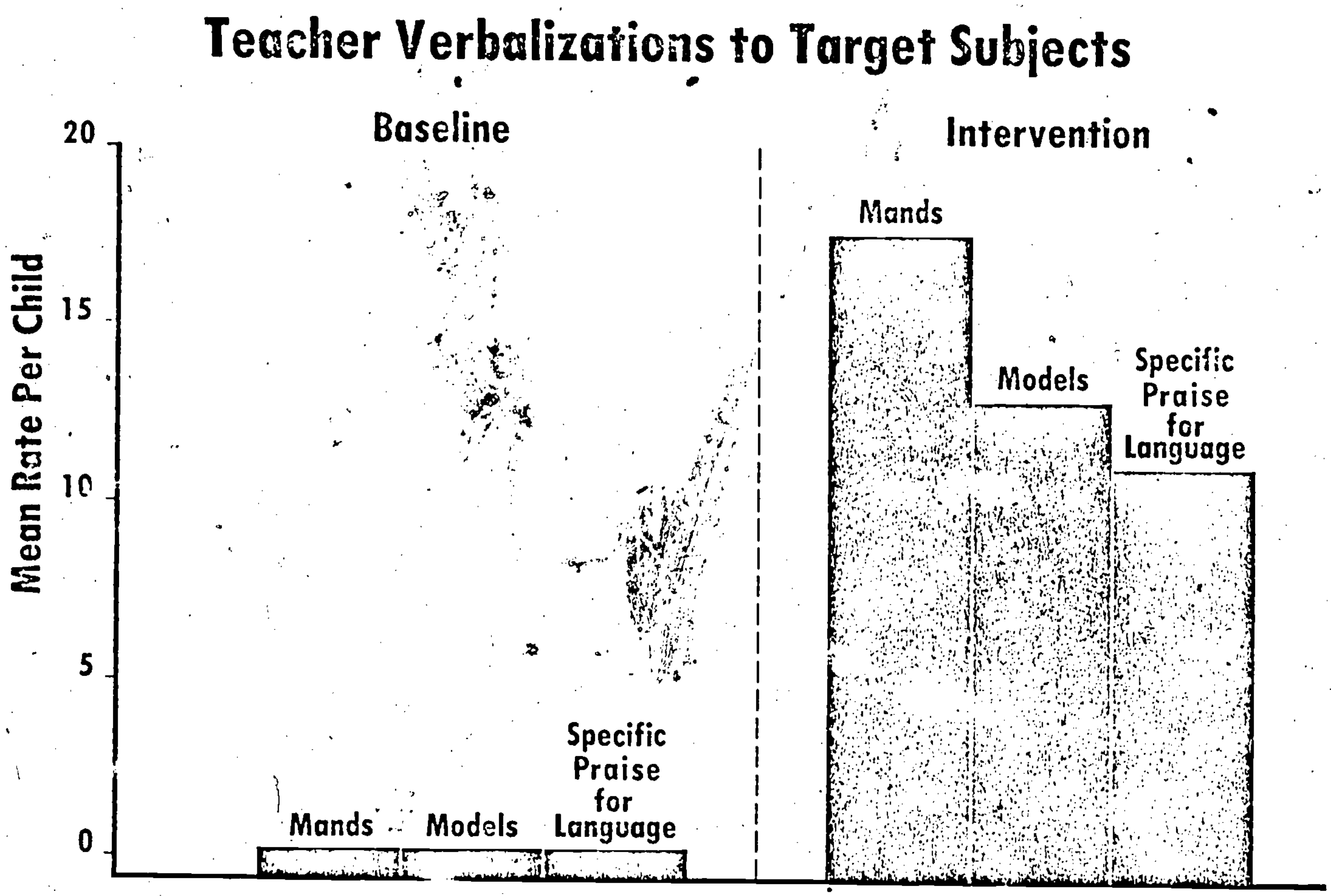

Teacher Verbalizations to Target Subjects
Baseline
Intervention
Mean Rate Per Child
20
15
10
5
0
Mands
Models
Specific Praise for Language
Mands
Models
Specific Praise for Language

Figure 1

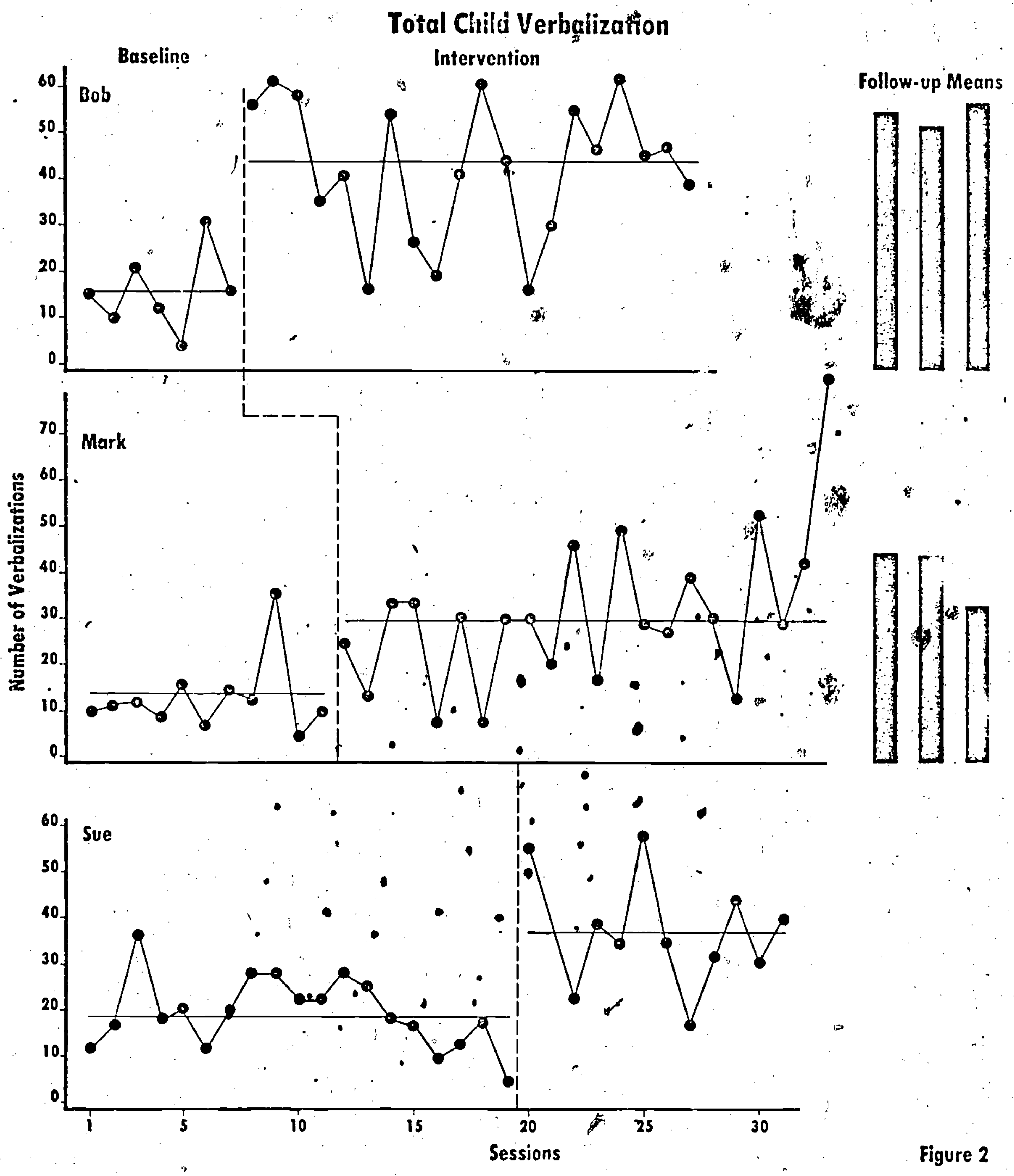

Total Child Verbalization
Baseline
Intervention
Follow-up Means
Bob
Mark
Sue
Number of Verbalizations
Sessions
0
10
20
30
40
50
60
70
1
5
10
15
20
25
30

Figure 2

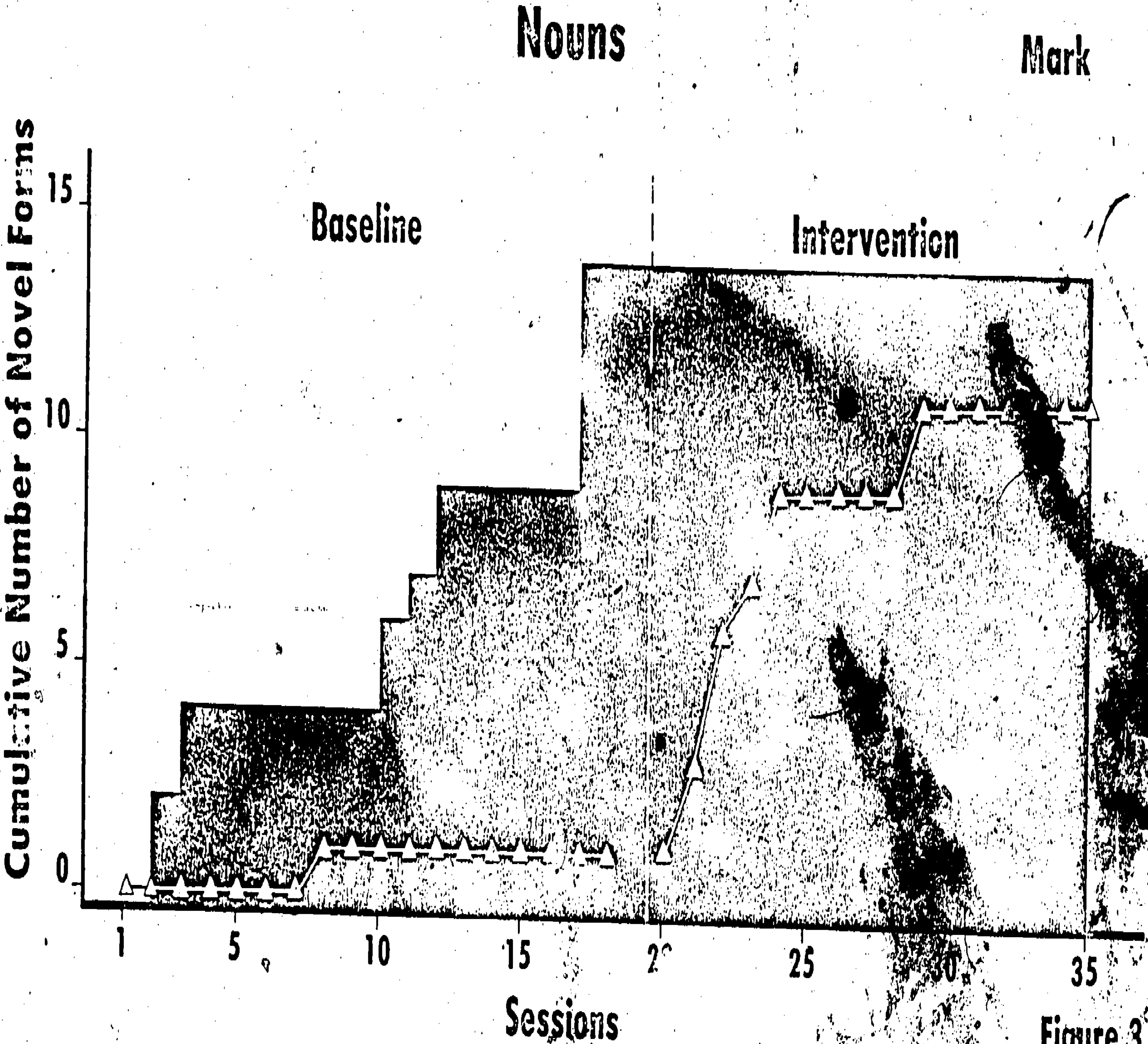

Nouns
Mark
Cumulative Number of Novel Forms
15
10
5
0
Baseline
Intervention
1
5
10
15
20
25
30
35
Sessions

Figure 3

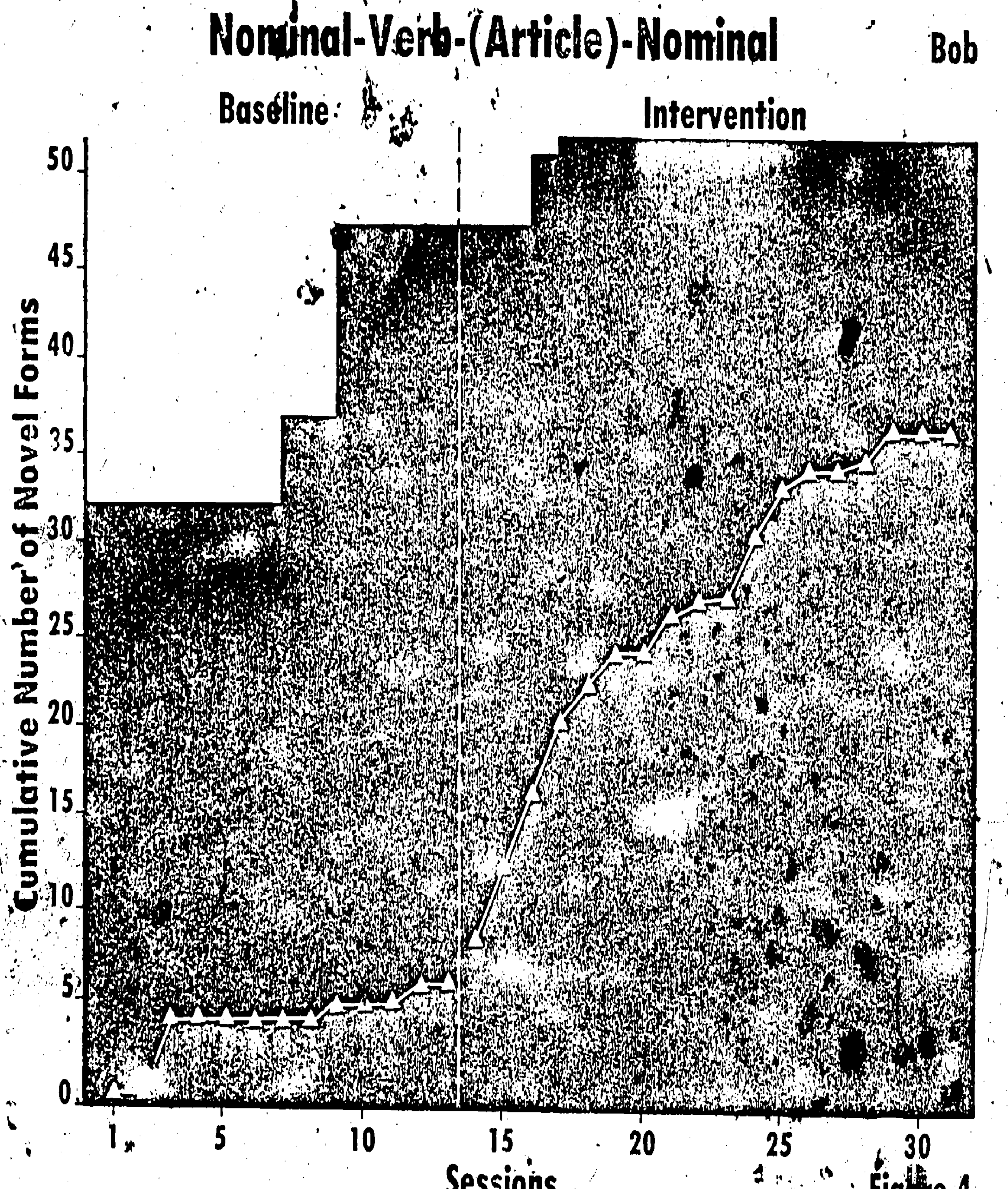
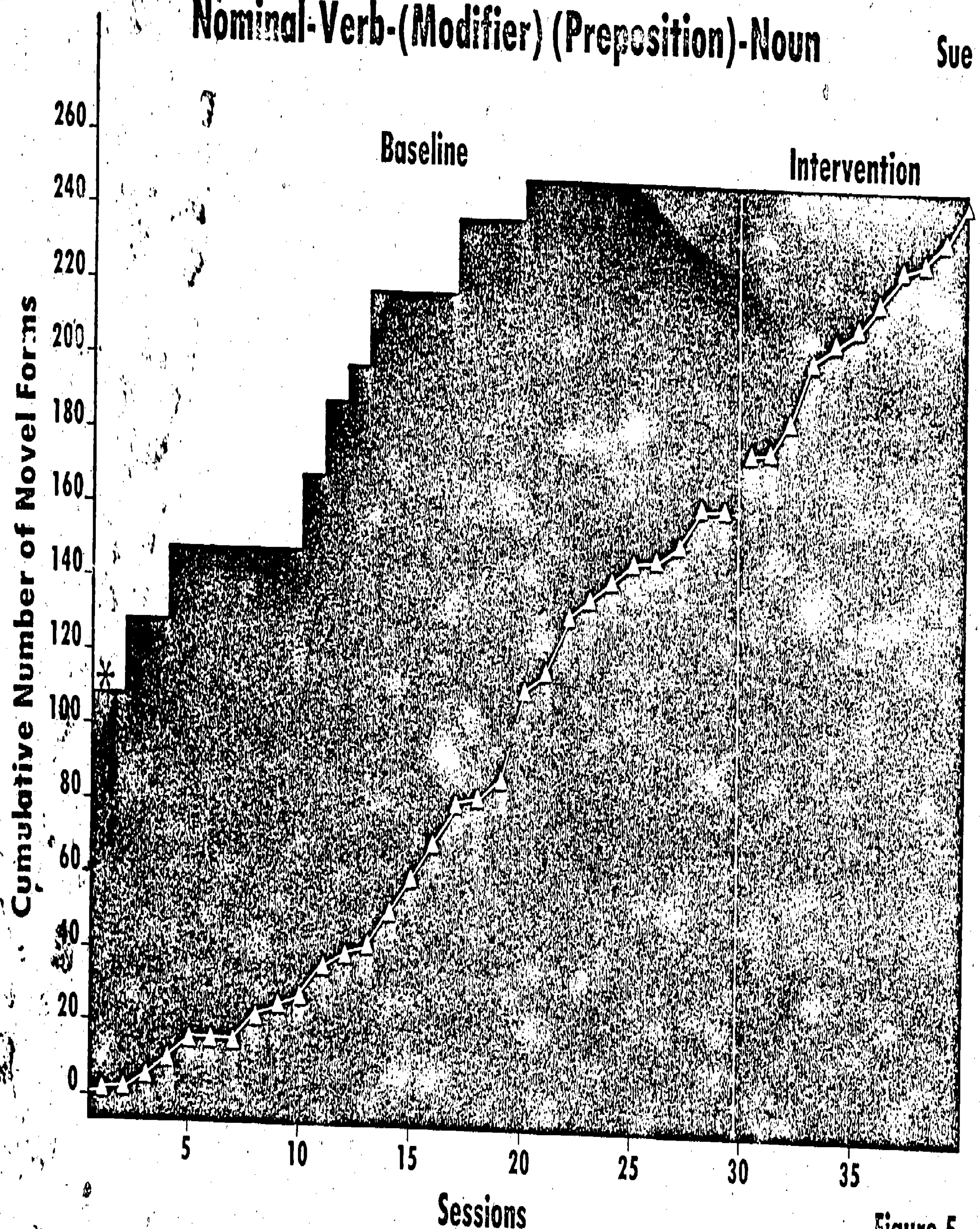

Nominal-Verb-(Article)-Nominal
Bob
Baseline
Intervention
Cumulative Number of Novel Forms
0
5
10
15
20
25
30
35
40
45
50
1
5
10
15
20
25
30
Sessions

Figure 4



Nominal-Verb-(Modifier) (Preposition)-Noun
Sue
Baseline
Intervention
Cumulative Number of Novel Forms
260
240
220
200
180
160
140
120
100
80
60
40
20
0
*
5
10
15
20
25
30
35
Sessions

Figure 5

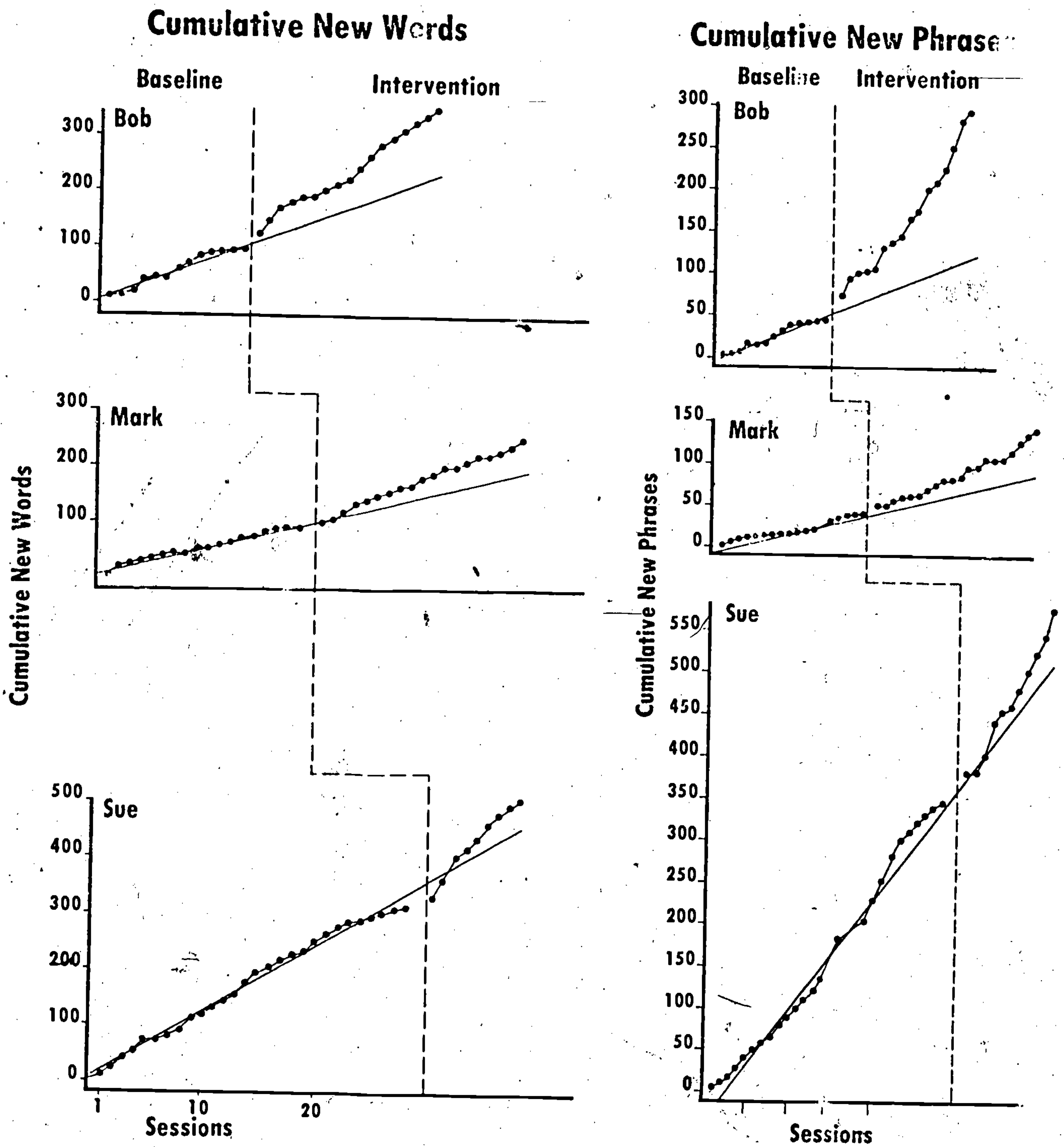

Cumulative New Words
Baseline
Intervention
Bob
Mark
Sue
Cumulative New Words
Sessions
Cumulative New Phrases
Baseline
Intervention
Bob
Mark
Sue
Cumulative New Phrases
Sessions

**Figure 6**

Table 2

Child Responsiveness

| Experimental Subjects | | Obligatory Response Occasions: Baseline | Intervention |
|---|---|---|---|
| Bob | Mean No. of Occasions | 8.7 | 47.2 |
| | % Responded To | 51% | 75% |
| Mark | Mean No. of Occasions | 9.0 | 43.1 |
| | % Responded To | 27% | 54% |
| Sue | Mean No. of Occasions | 5.5 | 38.4 |
| | % Responded To | 62% | 74% |
| **Normal Peers** | | **1st Half of Term** | **2nd Half of Term** |
| Kathy | Mean No. of Occasions | 11.4 | 8.4 |
| | % Responded To | 69% | 64% |
| Matt | Mean No. of Occasions | 15.4 | 15.0 |
| | % Responded To | 84% | 72% |

APPENDIX VII

Experimental Study Abstracts

Incorporating Usage of Nondisabled Peer Modeling in Teachers' Interactions with Developmentally Disabled Preschool Children

Thomas M. Longhurst and Deborah Shank-Andersen

Kansas State University

A recent trend in education, commonly called mainstreaming, has focused on integrating developmentally disabled children with nondisabled children in the same classroom. A variation, sometimes called reversed mainstreaming integrates nondisabled children into a classroom for disabled children. The assumption of both approaches is that the nondisabled children will provide beneficial models as well as providing a more normalized educational environment for the disabled children. Observations of a reverse mainstreamed preschool classroom suggested that disabled children seldom modeled or imitated the nondisabled children. Further, teachers seldom used the nondisabled children systematically as models in their teaching. The current investigation was undertaken to determine how often teachers use nondisabled children as models in a reverse mainstreamed classroom. Further, it was designed to see if teachers' rate of peer modeling could be increased as a function of the teachers receiving systematic training in peer modeling techniques.

Methods

Subjects were four teachers in an integrated classroom composed of three nondisabled preschool children and six disabled children. The teacher-child verbal interactions were tape recorded 2-3 times a week over a 12-week period in three group situations: circle, snack, and music. Peer modeling was defined as an instance in which the teacher asked a nondisabled child a question or asked for a response and immediately afterward repeated the question or request to a disabled child. The first two weeks were used to collect baseline data. Beginning in the third week, after baselines were stabilized, teacher training began. This consisted of weekly staff meetings in which research on the beneficial effects of modeling were reviewed, instructions were given, the teachers role-played peer modeling, and suggestions for peer modeling were given while teachers listened to tape recordings of classroom interactions. The experimenter also demonstrated the use of peer modeling in the classroom. After four weeks, when training effects stabilized, staff meetings were discontinued. After an additional four weeks, and again at six weeks, tape recording probes of classroom interaction were obtained. Classroom activities were being tape recorded periodically during this entire period as part of an ongoing research project, therefore, the teachers probably did not know when the probe recordings were made.

Results

Examination of the baseline data suggested that teachers seldom used nondisabled children as models in any group situations. When training was initiated, the rate of peer modeling increased to a level of about 1.5 to 2.5 models per 2 min in circle and snack, and about 3.5 to 4.5 models in music. When peer modeling was probed at four and six weeks after training ended the training levels were maintained.

Discussion

Four teachers were successfully trained to use nondisabled peers in three group situations as models for disabled children. The training involved instruction, role-playing, and demonstration as well as reinforcing the teachers use of the nondisabled children as models. The effects of the training were maintained at least six weeks after the training was discontinued. Generally, application of the procedure to classroom activities appeared to increase the interaction of the teachers with both groups of children. The mode of instruction in the classroom changed from one of "lectures" with little interaction to one of increased interaction, modeling, and imitation.

FINAL REPORT ABSTRACT

Programming "Loose Training" as a Strategy to Facilitate Lanuage Generalization

By

C. Robert Campbell

The efficiency of the language intervention process is highly dependent on the systematic examination of programming strategies which will promote both the acquisition and generalization of language behavior. The demonstration of programmed language intervention resulting in spontaneous generalization of complex language behavior across environmental conditions is limited.

The two subjects selected for this study were moderately language delayed males enrolled in a classroom for the trainable retarded. Both demonstrated the basic sentence forms (i.e., "Wh" questions, "yes-no" reversal questions, and statements) under investigation in his spontaneous speech. Only minimal use of two syntactic forms (i.e., auxiliary verbs is/are and copula verbs is/are) in the above sentence forms were observed to occur in their spontaneous speech samples.

Academic and language training sessions were conducted in a partitioned area of each subjects classroom. Generalization observations were made directly in the classroom during periods when subjects were not participating in a formal training session (i.e., freeplay). Freeplay periods involved segments of the day when subjects were permitted to select games, materials to play with either individually or in small groups.

zation and generalization across time in a spontaneous, nonstructured (i.e., freeplay) setting as a result of programming a "loose training" strategy for the acquisition of is/are in the three sentence forms. A within-subjects, across-behaviors multiple-baseline design was employed to examine both subjects' performance under acquisition and generalization conditions.

The language training procedure employed represents a functional example of programming "loose training". The proceudre, described as a contextual initiation procedure, involved: a) concurrently conducting language training within the context of an academic training task, and b) establishing a functional reduction in stimulus control by permitting the subject to select his own environmental stimulus and initiate a response to that stimulus. Concurrent probes were conducted in the freeplay setting to establish the potential for immediate generalization and generalization across time of the language behaviors. The results (figure 1a, 1b and 2a, 2b) demonstrated that the procedure for programming "loose training" was effective in establishing a specific set of language responses with the subjects of this investigation. Further, both subjects demonstrated spontaneous use of the language behavior in the freeplay generalization setting and a trend was clearly evident for generalization to continue across time.

The subjects had an opportunity to learn a specific set of language structures across a wide variety of stimulus conditions. Acquisition of a set of language responses was demonstrated while reducing the control, restriction, and standardization generally associated with systematic instruction. Instead of a limited number of examples a stimuli, predetermined by the trainer, the subject had an opportunity to initiate his own training stimuli in the form of questions or statements. This provides the trainer much greater opportunity to sample the functional use of a given language response. Thus, the methods employed appear to be successful for training and generalization of the English verbal auxiliary and copula "is/are" in three sentence forms and possibly can be used in training other complex language behaviors.

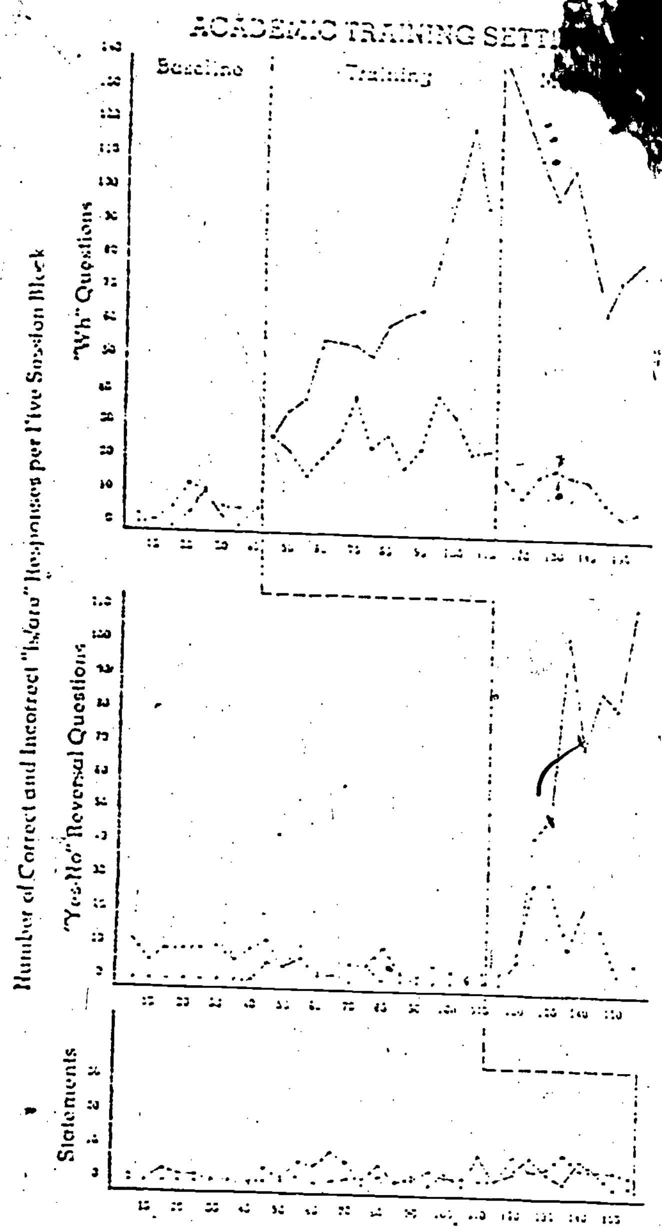



FIGURE 1a
Five Session Blocks
The Number of Correct and Incorrect "[illegible]" Responses
T.L. Made Per Five Session Block in the Academic Training
Setting

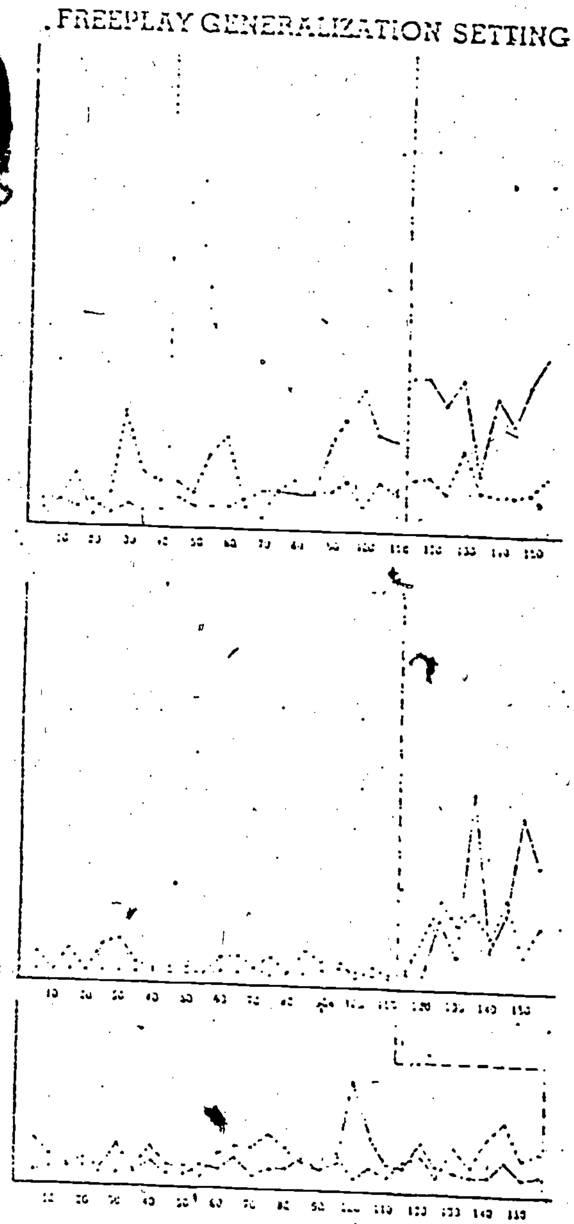



FIGURE 1b
Five Session Blocks
The Number of Correct and Incorrect "[illegible]" Responses
T.L. Made Per Five Session Block in the Freeplay
Generalization Setting

Frequency Correct
Frequency Incorrect

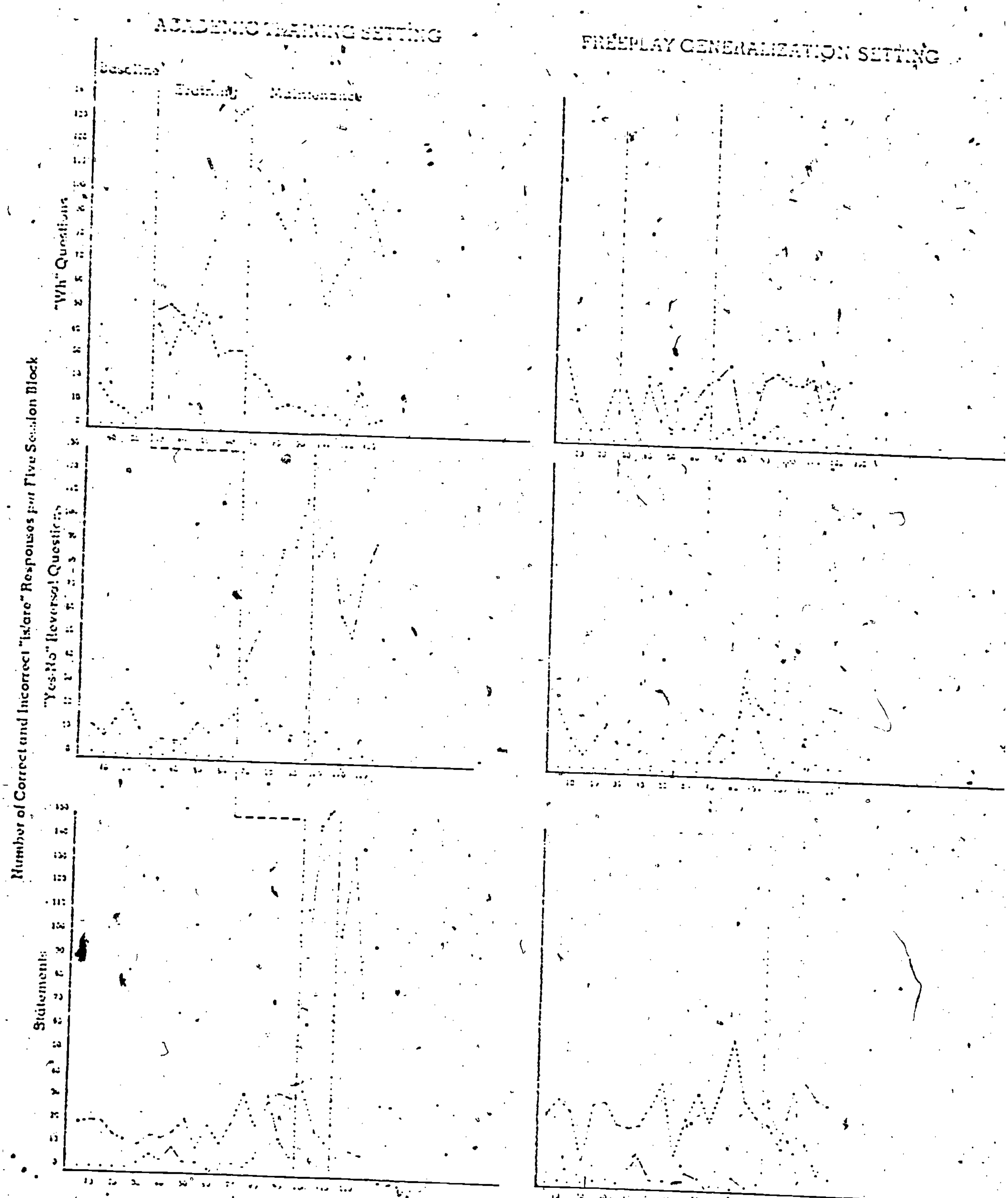



FIGURE 2a
Five Session Blocks
The Number of Correct and Incorrect "Is/are" Responses S.D. Made Per Five Session Block in the Academic Training Setting

FIGURE 2b
Five Session Blocks
The Number of Correct and Incorrect "Is/are" Responses S.D. Made Per Five Session Block in the Freeplay Generalization Setting

FINAL REPORT ABSTRACT

## Differences in Generalization Between Speech and Signing Subjects

by

Kathleen Stremel-Campbell

Research and evaluative data have demonstrated that non-vocal, retarded students can learn to communicate via non-vocal modalities, such as manual signing and communication boards. However, many persons stress that teaching students to use a non-vocal language system, particularly manual signs, is not functional since most people in the environment will not be able to communicate with the students. And consequently, very little generalization to non-training environments will occur. Very little data are available that suggest how non-vocal students use language in non-training environments or what training techniques would facilitate generalization to non-training environments. The present study investigated the generalization of verb-noun utterances from students using speech and students using manual signs.

Four moderately retarded subjects were trained to use action-object utterances. Two of the subjects were trained to express these utterances with speech and two subjects were trained with manual signs. All four subjects were enrolled in the same classroom.

The classroom teacher and aides were trained to use manual signs and encouraged to use speech plus manual signs in their educational programming. The specific language training content and procedures were

the same for all four children. Ten verbs and ten nouns were combined for a total of 40 possible action-object utterances. Training on the action-object utterances continued until each subject met the criterion of 90% correct over five consecutive days. Fifteen-minute, verbatim observations were taken daily in the classroom setting. Frequency and first occurrences of action-object utterances were used as the generalization measurement. The verbatim data were analyzed across three different types of generalization which included:

1. Generalization I - Actions Trained
   Objects Trained
   Exact Combination Trained

2. Generalization II - Action Trained
   Object Not Trained
   Exact Combination Not Trained

3. Generalization III - Action Not Trained
   Object Not Trained
   Exact Combination Not Trained

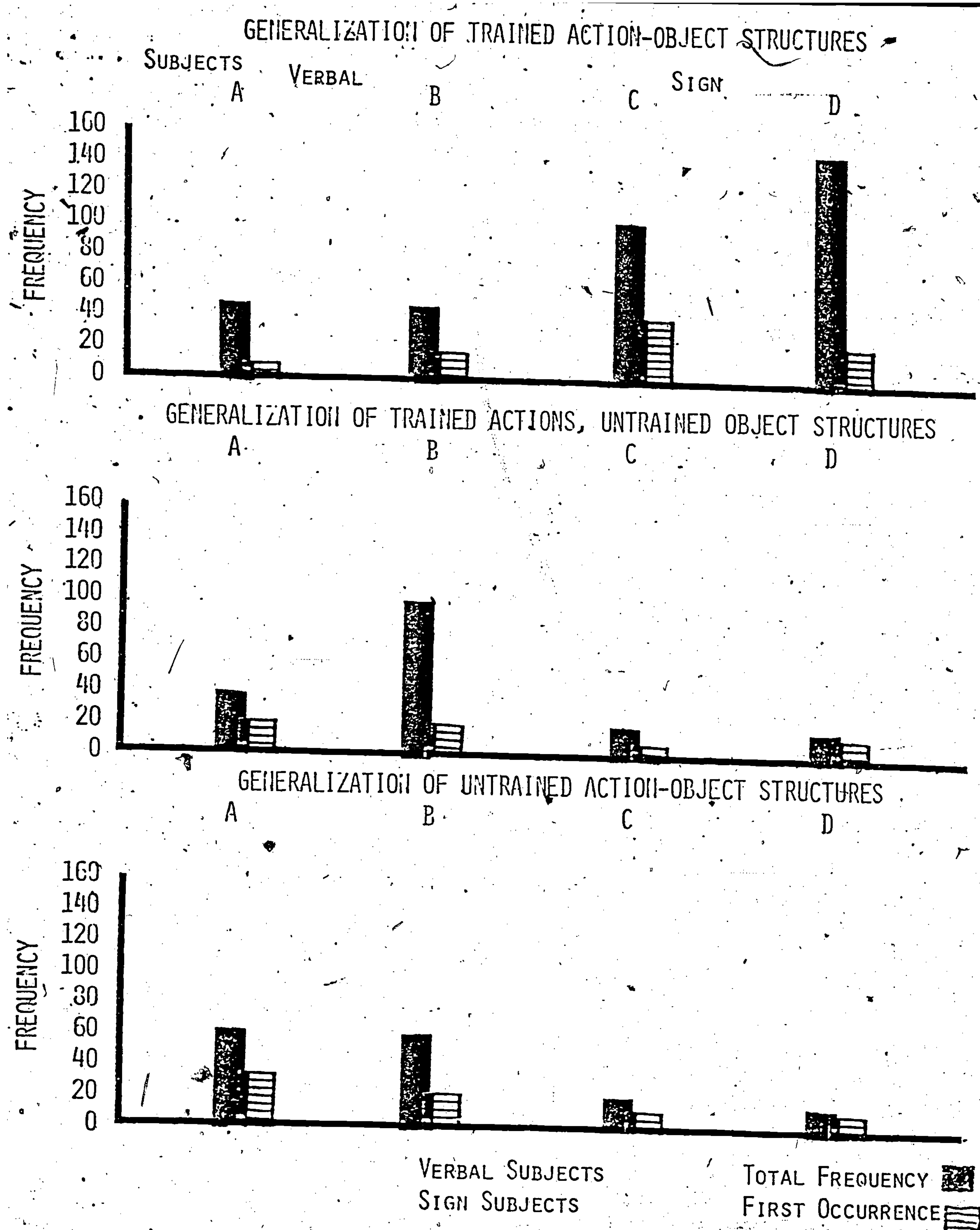
The results showed that both the verbal and the signing subjects used action-object utterances in the classroom setting after receiving training. However, the type of generalization varied across the subject groups. The data in Figure 1 show that the signing subjects used over twice as many trained action-object utterances in the classroom setting and approximately twice as many first occurrences than the verbal subjects. Alternately, the verbal subjects showed increased use of untrained action-object utterances over the signing subjects.

These data show that the signing subjects used trained signs and combinations to untrained settings. The data also suggest that the assessment for generalization may have to be extended for the signing subjects. Additional information should include answers to the following questions:

1. Do the teachers provide models or mands for untrained structures?

2. Do the signing subjects respond to untrained exemplars of trained behavior in non-training settings?

If the teachers are providing opportunities for the signing subjects to use untrained structures, sequential modification might include using multiple trainers and multiple exemplars. On the other hand if the persons in the non-training environment are not providing opportunities for additional learning, sequential modification would be directed toward training persons to extend the subjects' signing within those non-training environments.


GENERALIZATION OF TRAINED ACTION-OBJECT STRUCTURES
SUBJECTS
VERBAL
SIGN
A
B
C
D
FREQUENCY
160
140
120
100
80
60
40
20
0
GENERALIZATION OF TRAINED ACTIONS, UNTRAINED OBJECT STRUCTURES
A
B
C
D
FREQUENCY
160
140
120
100
80
60
40
20
0
GENERALIZATION OF UNTRAINED ACTION-OBJECT STRUCTURES
A
B
C
D
FREQUENCY
160
140
120
100
80
60
40
20
0
VERBAL SUBJECTS
SIGN SUBJECTS
TOTAL FREQUENCY
FIRST OCCURRENCE

FINAL REPORT ABSTRACT

# Programming Common Stimuli Across Training Structures and Settings

by

Kathleen Stremel-Campbell

Relatively little research is available that demonstrates the use of common stimuli in both training and generalization settings as an active generalization programming strategy. Many training programs select physical stimuli for training that have nothing in common with the physical stimuli contained within the generalization environment. Stokes and Baer (1977) stress that a common stimulus approach to generalization would encourage the inclusion of physical stimuli that are functional in nontraining environments into training settings. The following study was designed to investigate: (a) the effects of programming different component behaviors that are common to a larger class of behavior, and (b) the effects of programming within a training environment that contains physical stimuli common to the nontraining environments.

Three nonvocal, signing subjects were initially trained to use action-object (such as "cut apple") utterances in a structured language setting. An analysis of the verbatim data showed that the use of these structures generalized to the classroom setting which was similar to the training setting. However, verbatim samples collected in the dining hall showed that all three subjects demonstrated only minimal (if any)

generalized use of the trained structure in that setting even though the training content was functional to that setting (get glass, pour milk, eat bread). The subjects ate all three meals at the dining hall which was located in a building separate from the classroom and language training building. The teachers and aides who were responsible for supervising meals differed across each meal.

A multiple baseline design across language structures and across settings was used to determine if structures trained in a lunch setting would generalize to common settings (breakfast and dinner). Additionally, multiple language responses were selected that included unrelated responses that were components of longer utterances. The unrelated and related behaviors were selected to determine the replication across behaviors and the response generalization of trained components to longer utterances. Baseline data was collected across lunch, breakfast and dinner for the following utterances:

1. action - object
2. agent - action
3. agent - action - object
4. feature - object
5. agent - action - feature - object

After baseline sessions were completed, training was initiated on action - object utterances during the lunch period.

Training consisted of a fifteen-minute period with the trainer being seated next to the subject. Specific stimuli were not selected, but rather the subject's appropriate, one-word responses and initiations were expanded to include action - object responses. Correct initiations were

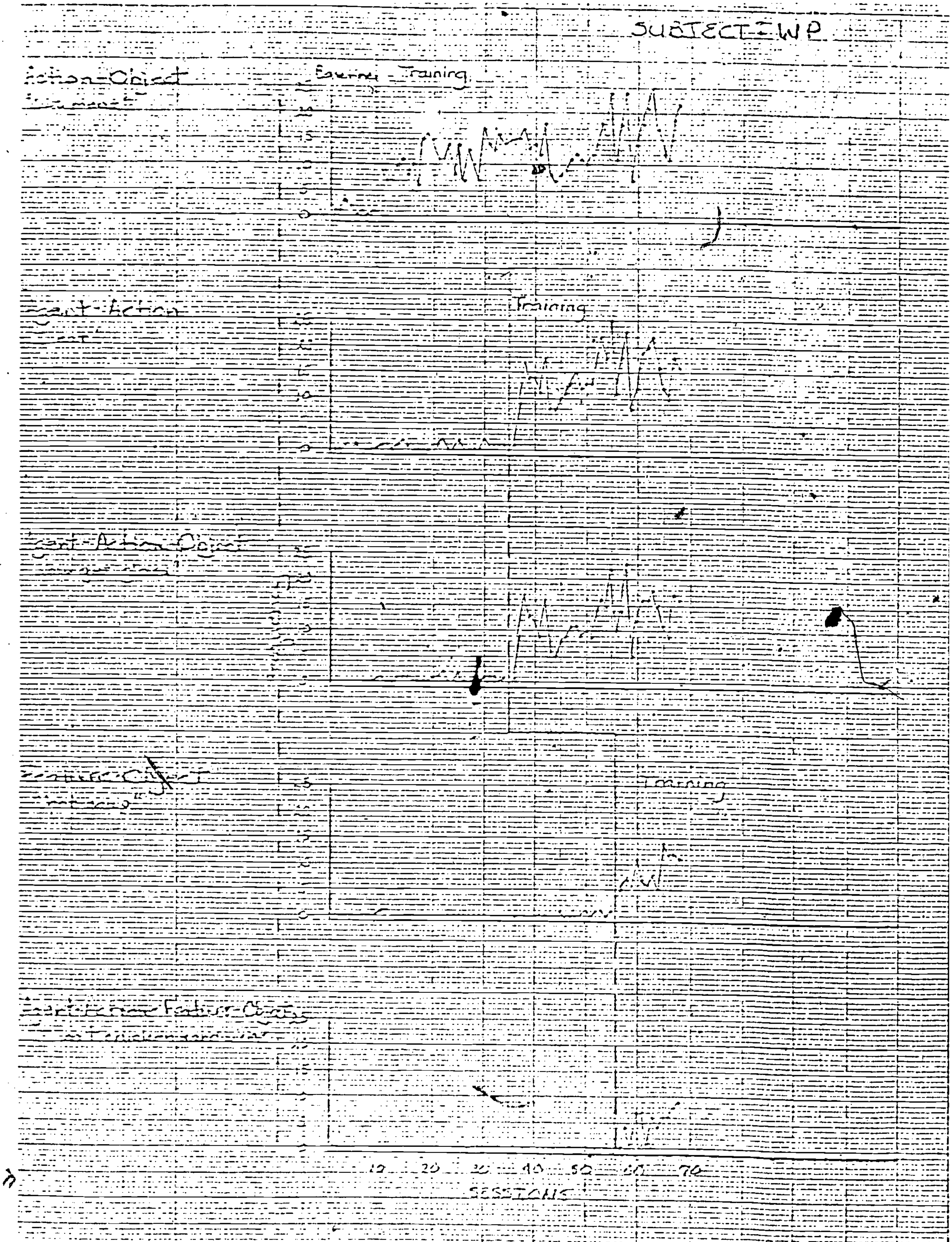
consequated with social and token reinforcement. When each subject reached a criterion of at least ten target responses across three consecutive sessions, the next behavior was added to training.

The trainer and an observer recorded verbatim data during the lunch period. Two observers collected verbatim data during the breakfast and dinner periods. This data was used to assess generalization across settings.

Figure la, lb, and lc show the subjects' generalization of the trained component structures to the untrained structure. Baselines for the untrained structures remained low until training was initiated. All subjects showed immediate generalization to Agent-Action-Object structures and all subjects showed very little isolated use of Agent Action utterances. The data re plotted as separate or components of a longer utterance. Subjects WP and KM also demonstrated structured generalization of feature-object utterances to a longer utterance. Subject MG showed a decrease in agent-action-object utterances when the feature-object utterance was trained; however, no decrease in action-object utterance was demonstrated. In fact many of MG's feature-object utterances were incorporated within action-feature-object utterances.

All three subjects showed different degress of generalization across common settings. Subject WP demonstrated a fairly high frequency of generalization across all trained structures to the breakfast setting and a somewhat lower frequency to the dinner setting. Generalization in both settings was somewhat delayed. Usbject KM did not show generalization across settings until his trained was included as an additional common stimulus. The trainer went into the breakfast setting for five sessions and recorded data. During that time, she did not interact with the subject. Generalization then occurred within the breakfast setting and generalization to the dinner setting occurred but was somewhat delayed. Subject MG did not demonstrate generalization across settings until the trainer consequated the behavior in at least one setting. Even though only feature-object utterances were reinforced, generalization occurred across the previously trained structures.

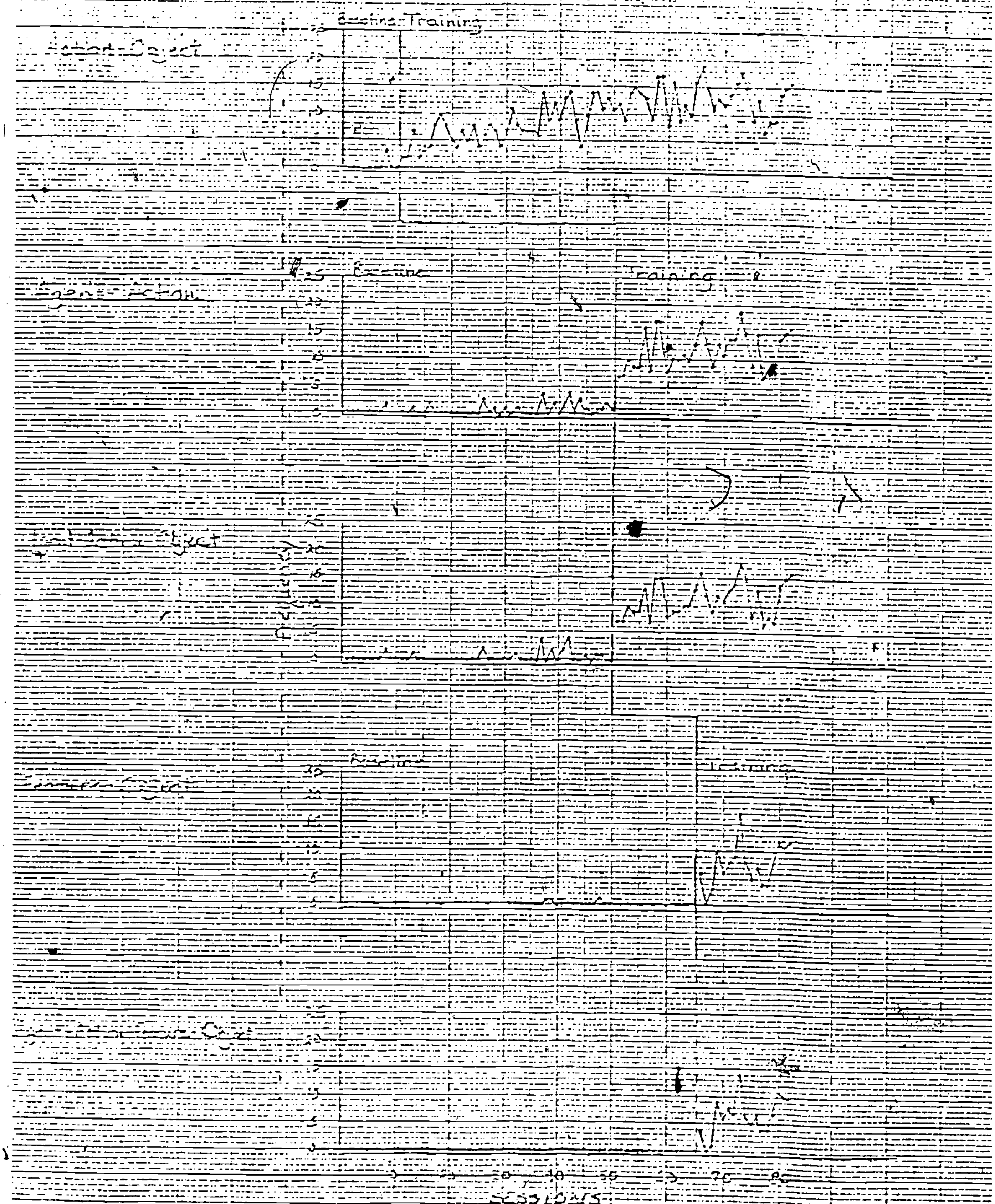
The data show that response generalization for all subjects occurred when components of a behavior had been trained. However, only one subject demonstrated that the use of common settings alone was effective in demonstrating generalization. For two subjects additional physical stimuli needed to be incorporated into the generalization environment before generalization was demonstrated. These data suggest that programming common stimuli is an effective generalization strategy but the number or degree of common stimuli between the training and generalization may need to be systematically varied for each individual child.



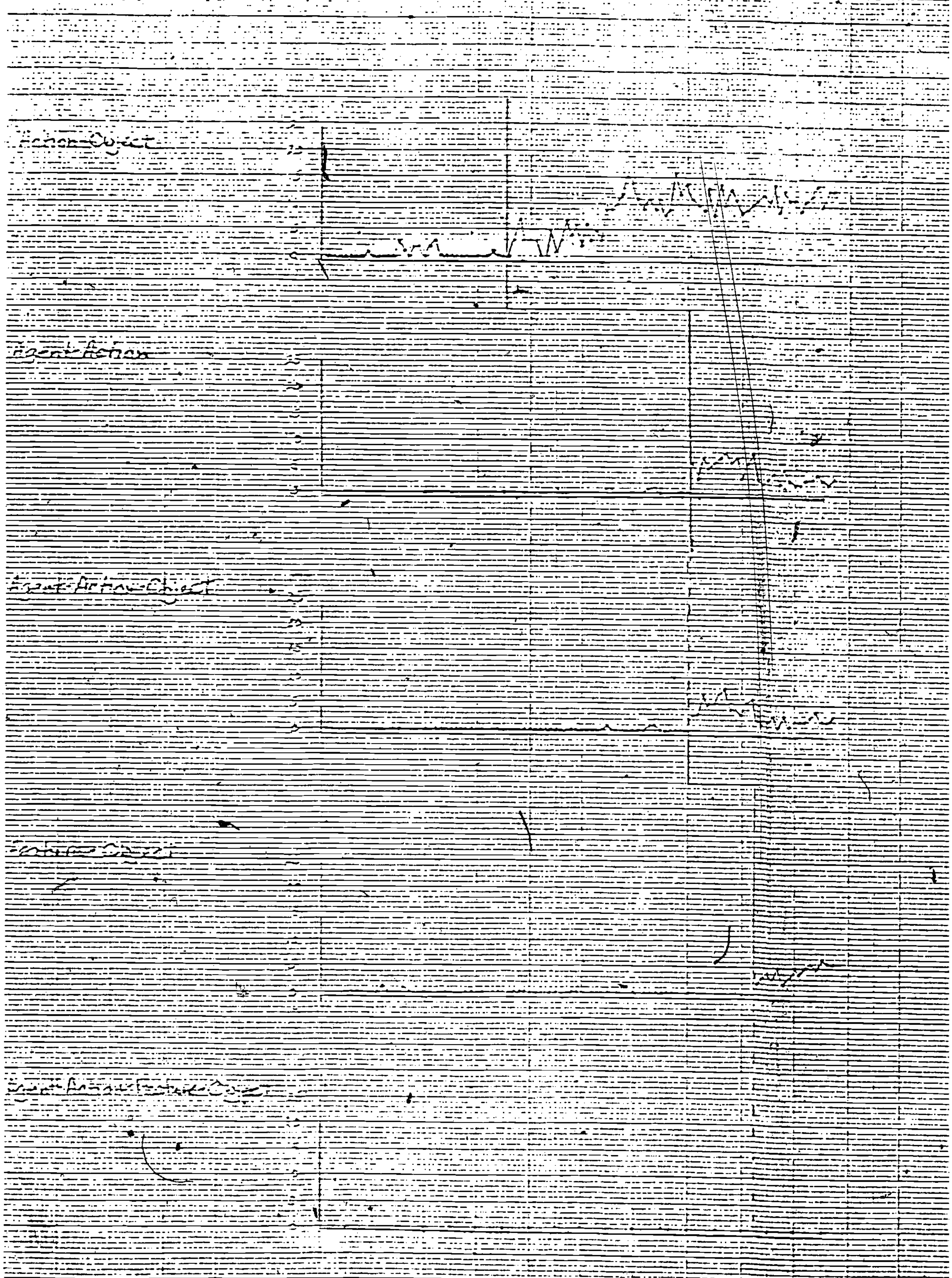
SUBJECT WP
Action-Object
Training
Agent-Action
Training
Agent-Action-Object
Training
SESSIONS

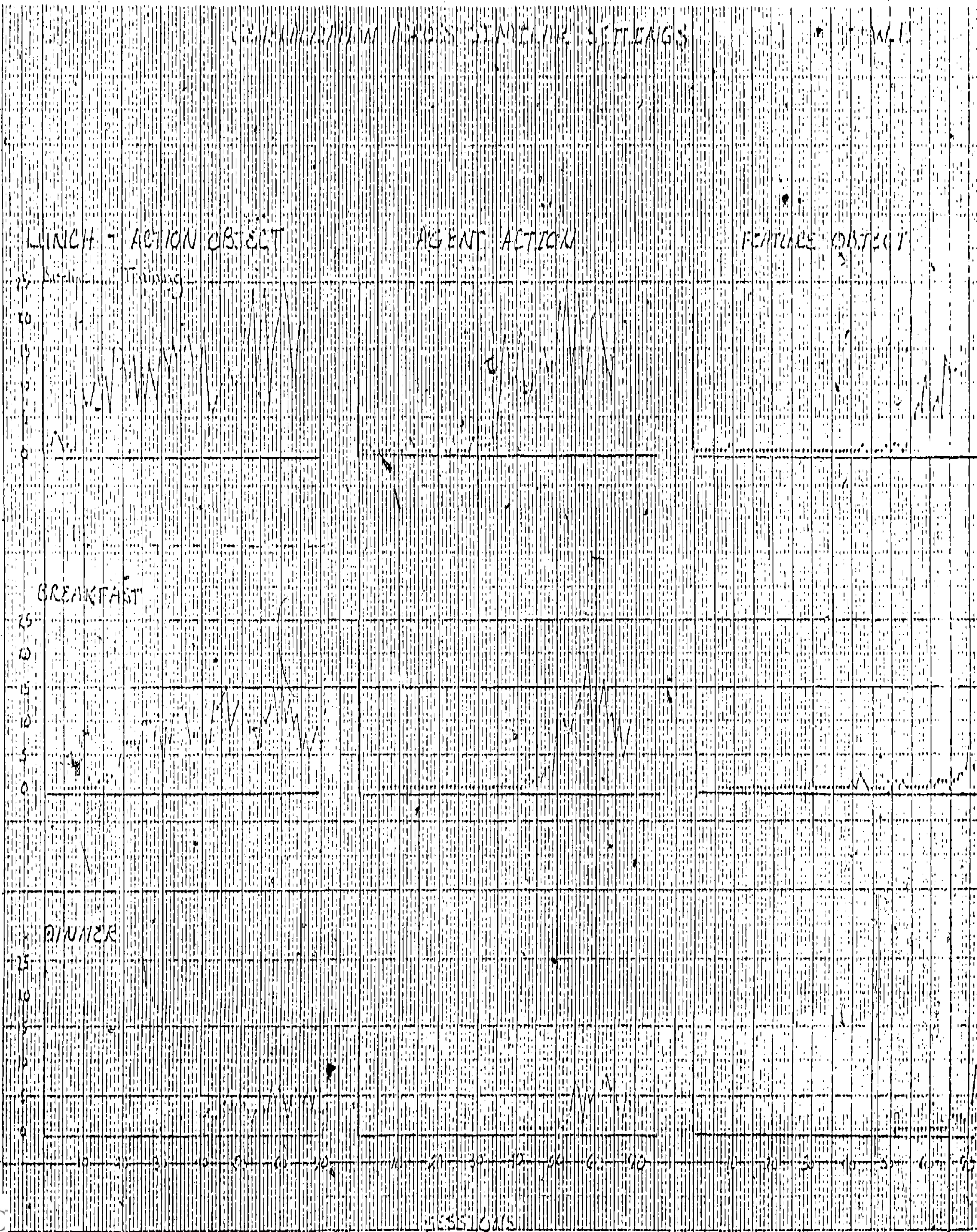
GENERALIZATION ACROSS STRUCTURES

SUBJECT: KM



GENERALIZATION ACROSS STRUCTURES MG




LUNCH - ACTION OBJECT
AGENT ACTION
FEATURE OBJECT
BREAKFAST
DINNER


KM
ACTION OBJECT
AGENT ACTION
FEATURE OBJECT
SESSIONS

# FINAL REPORT ABSTRACT

## Training Sufficient Communication Functions

by

Kathleen Stremel-Campbell

Language studies have primarily been concerned with the structure of language and the comprehension of those structures to extract their meaning. More recently the study of language acquisition has concentrated on the function or use of language in addition to it's structure and meaning. These considerations of how language functions for the normal child have important implications in language training as well. The language-delayed child must learn that identical syntactic structures can be used to function differently and can represent various communication functions (Halliday, 1975). The purpose of the present study was to investigate the acquisition and generalization of three different communication functions. The functions that were selected were those that could be used to: 1) announce intentions, 2) request action, and 3) describe on-going or completed action.

A multiple baseline design across communication functions was used to determine if utterances trained to be used for one function would generalize to other non-trained communication functions. Two severely handicapped students served as subjects. Baseline probes showed that neither subject used "action-object" utterances within a training setting. The subjects were initially trained in speaker-listener dyads to use twenty different "action-object" (cut apple) utterances to announce their

intentions of acting on objects - Condition I. Within this first condition (announcing intentions) the stimulus objects were placed in front of the subject and the mand, "Tell me what you're going to do" was given. The subject was required to use the "action-object" response that was appropriate for the action upon the object. The subject was given permission to act upon the object (pour pop, etc.) if he used the correct "action-object" response. Therefore, the consequence was directly related to the response. When the subjects had met criterion (90% correct for three consecutive sessions) on Condition I, probes on Condition II and III were introduced to determine if the subjects could use the twenty trained utterances to communicate untrained functions. The physical stimulus arrangement and the consequence that followed were different for each condition:

Condition II: Requesting action of peer

Stimulus Object: placed in front of peer.

Stimulus Directive: "Tell P what do do?"

Consequence: peer acted on object and gave speaker object also (poured two pop in two cups)

Condition III: Describing on-going or completed action

Stimulus Object: peer or trainer activity on object

Stimulus Directive: "What's P doing?" (only in initial phases)

Consequence: Acknowledgment of S utterance and proceed to give next trial to S.

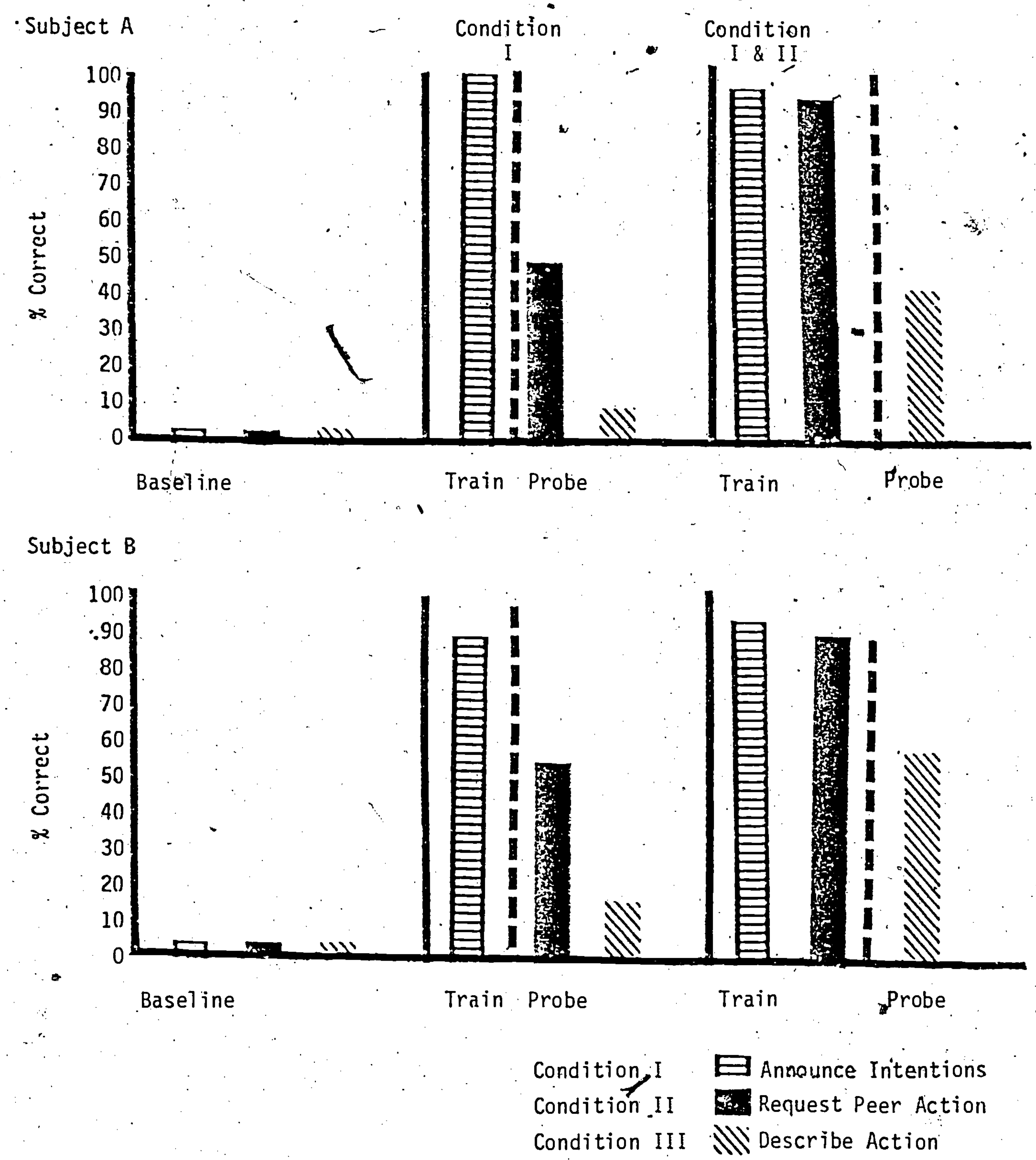
The twenty trained utterances were probed across two sessions, with a total of 90 trials being presented for each condition.

Figure 1 displays the probe data for Condition II. (Requesting action of peer) and Condition III (Describing action). Even though the correct responses of Condition II - requesting peer action-increased for both subjects, correcting responding was only 50% correct. Probe data for Condition II - describing action - showed only low levels of correct responding for both subjects. Training was then initiated on Condition II - requesting peer actions with Condition II trials randomly interspersed with Condition I trials - Probes for Condition III - descriptive function - followed when Condition II training was completed. Both subjects showed increases in describing action, but the respective response levels were approximately 40% and 60% for Subjects A and B. Training on Condition III was then initiated.

The results of this study show that utterances or structures trained to express one communication function do not automatically insure generalization to untrained functions. However, the data demonstrate that responding to express each function increase as more functions are trained. The specific data also show a dramatic decrease in the number of training trials necessary to train each successive function. Even though the response remains constant across each condition or function, the stimulus conditions and consequences change; therefore, the subject must learn to make a similar response under different stimulus conditions and learn that the consequences for those responses will change. Subsequently, sufficient communication functions is necessary if the child is to use language to represent different communication functions. Additional research includes investigating untrained utterances (such as, agent-action-object) to determine if these utterances will be used to express the various trained functions.

Figure 1

Training Sufficient Communication Functions



FINAL REPORT ABSTRACT

Programming Maintenance Training as a Strategy to Facilitate Sign Generalization to a Non-Training Setting

Kathleen Stremel-Campbell and C. Robert Campbell

Programmed language intervention for the severely retarded non-verbal child has only recently received the attention of language interventionist (Stremel-Campbell, Halle & Cantrell, 1977; Carrier, 1974; Kopchick, Romback & Smilovitz, 1975; Richardson, 1975). At this time little is known about the variables which will facilitate spontaneous use of sign language by severely retarded children. The present study was designed to determine if extended training or maintenance training affected the generalization of initial sign acquisition to extra-training settings. Four non-verbal, severely retarded children served as subjects. Since the children had not been successful at verbal imitation, manual signs were selected as their modality of communication. Twenty functional noun signs were selected as training items. These twenty nouns were divided into four sets, with five signs being trained in each set.

A multiple baseline design across subjects was used to determine the effectiveness of maintenance training. Before training was initiated, two of the children were assigned to the maintenance condition (FR 2 schedule) and two were assigned to the non-maintenance condition (Table 1).

Insert Table 1 about here

After Subjects A and B met criterion on Set I, Set II was trained and Set I

was maintained on an FR 2 schedule of reinforcement. These children received 20 maintenance trials during each session. After subjects A and B met criterion on each set, that set was placed in maintenance training with the other sets. Subjects C and D did not receive maintenance training while Set I, II, III or IV were being trained. Once criterion was met on Set I, training on that set ceased and Set II training was initiated. Each trained set was essentially placed on hold until training on all four sets (20 nouns) was completed. At this time, Subjects C and D received maintenance training. When all four subjects maintained at 90% criterion for three consecutive sessions across all 20 nouns, verb training was initiated. The noun maintenance for Sets I, II, III, and IV was continued for Subjects A and D while verbs were trained. Subjects B and C received only verb training. Four 15-minute verbatim samples were collected each week in the classroom to measure sign generalization in a non-training environment.

Figure 1 presents the generalization results for each of the four children. The data represents the generalization responses (verbatim sampling) across the non-training setting.

---

Insert Figure 1 about here

---

All subjects completed training on the four training sets. Subjects A and B (maintenance condition) showed increased generalization across time. Subjects C and D showed only minimal generalization which decreased to zero over time. After training was completed and the maintenance condition was introduced for Subjects C and D, generalization occurred and increased. However, when all four training sets were placed together for maintenance, both subjects required re-training.

Only Subjects A and D continued to receive noun maintenance training during verb training. The frequency of generalization for Subject A initially decreased when verb training was introduced, but increased to the previous level of generalization. The initial decrease for Subject D was slight and increased during verb training beyond the previous level of generalization. Subjects B and C showed decreases in generalization when the maintenance procedure was dropped.

---

Insert Figure 2 about here

---

Figure 2 shows the percent of generalization for each training set and the percent of total generalization. For example, if a child used (generalized) two out of the five signs in Set I, he received a score of 40% generalization. The subjects (A and B) receiving the initial maintenance procedure showed the highest percent of total generalization which was 50%. They used only half of the signs which were trained. Subjects C and D showed only slightly lower generalization scores, 35% and 40% respectively.

The results of this investigation demonstrate that maintenance training does facilitate generalization to a certain level. Additionally, generalization occurred more rapidly as each set was trained. Generalization was not durable when maintenance training was terminated.

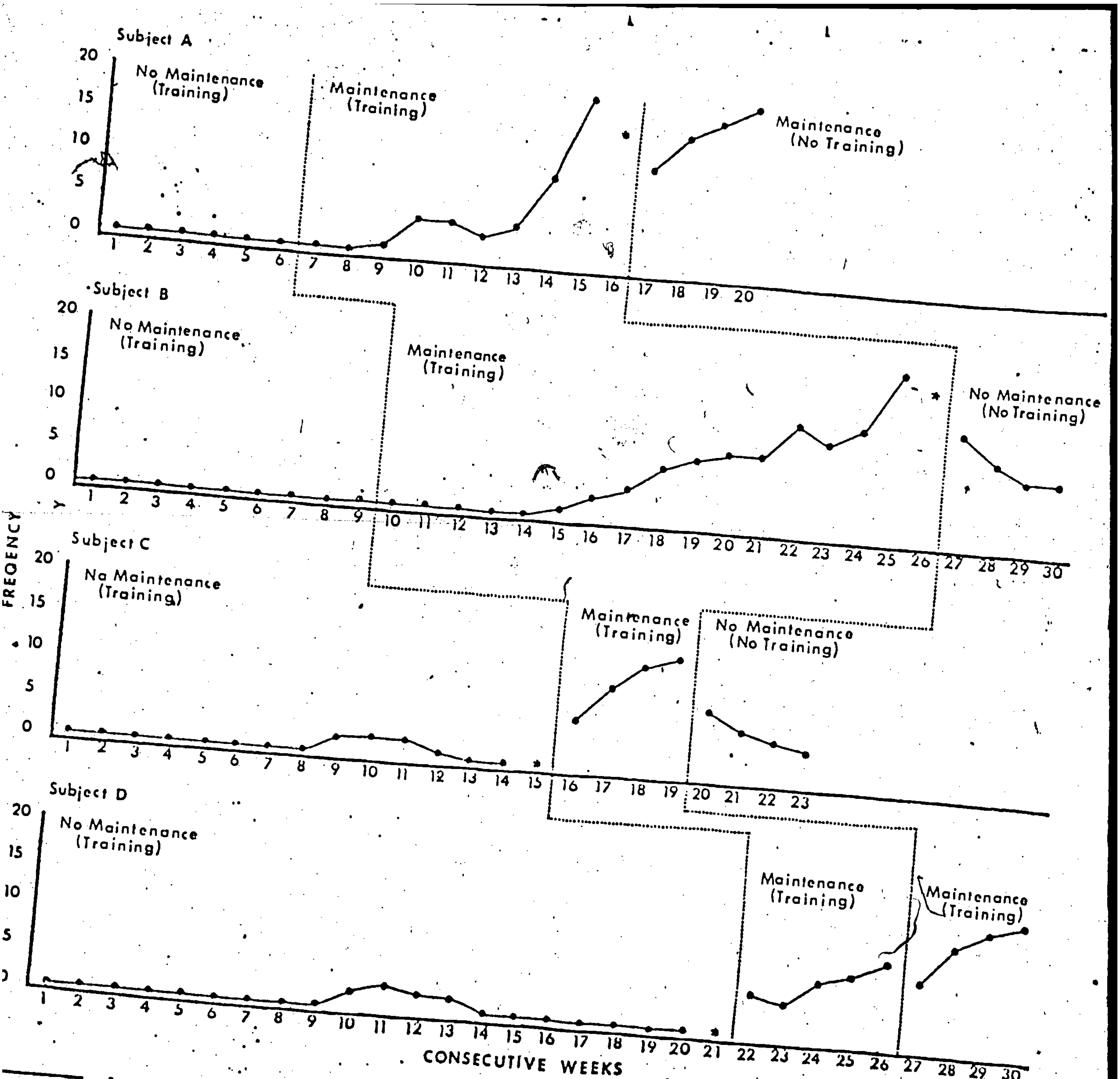
Even though the subjects receiving maintenance training demonstrated generalization to extra-training environments, the frequency of generalized signs was low. Since the subjects received a FR 2 schedule of reinforcement throughout maintenance training, the data did not show if the schedule of reinforcement facilitated generalization or if extended training on a

CRF schedule would produce a similar rate of generalization or if a more varied schedule (FR 3, FR 5, etc.) would have demonstrated more dramatic increases in generalization.

Table 1

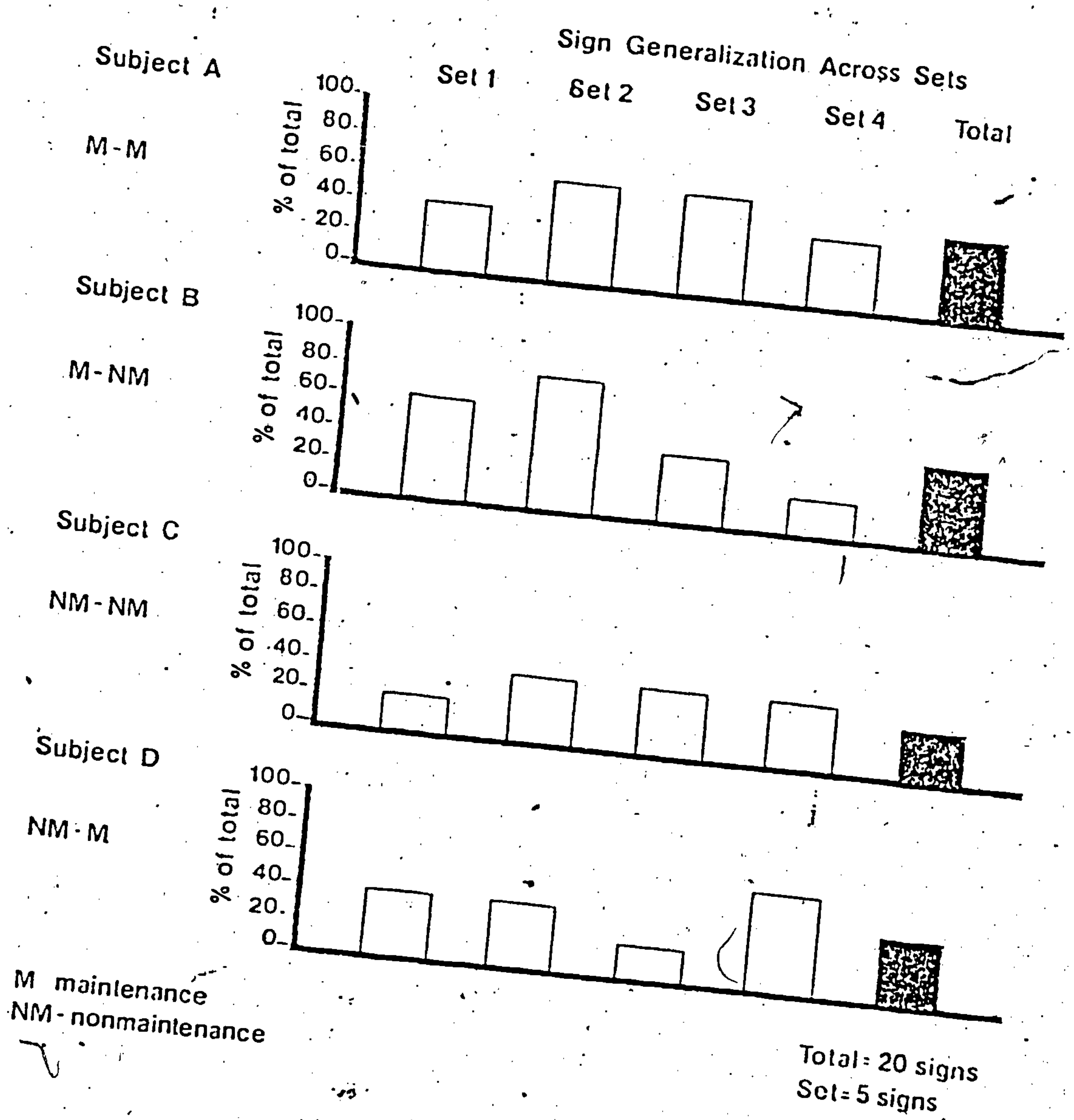
Conditions for Maintaining Nouns

| Subject | During Noun Training | | | During Verb Training |
|---|---|---|---|---|
| | | Trained | Maintained | |
| A | Baseline | Set I<br>Set II<br>Set III<br>Set IV | Set I<br>Set I & II<br>Set I, II, & III<br>Set I, II, III, & IV | Set I, II, III, & IV maintained |
| B | Baseline | Set I<br>Set II<br>Set III<br>Set IV | Set I<br>Set I & II<br>Set I, II, & III<br>Set I, II, III, & IV | |
| C | Baseline | Set I<br>Set II<br>Set III<br>Set IV | Set I, II, III, & IV | |
| D | Baseline | Set I<br>Set II<br>Set III<br>Set IV | Set I, II, III, & IV | Set I, II, III, & IV maintained |



Subject A
No Maintenance (Training)
Maintenance (Training)
Maintenance (No Training)
Subject B
No Maintenance (Training)
Maintenance (Training)
No Maintenance (No Training)
Subject C
No Maintenance (Training)
Maintenance (Training)
No Maintenance (No Training)
Subject D
No Maintenance (Training)
Maintenance (Training)
Maintenance (Training)
FREQUENCY
CONSECUTIVE WEEKS

Figure 2



Sign Generalization Across Sets
Subject A
M-M
Subject B
M-NM
Subject C
NM-NM
Subject D
NM-M
% of total
100
80
60
40
20
0
Set 1
Set 2
Set 3
Set 4
Total
M maintenance
NM - nonmaintenance
Total = 20 signs
Set = 5 signs

FINAL REPORT ABSTRACT

The Generalization and Maintenance of Question-Asking Behavior by Severely Retarded Children

By

Steven F. Warren, Debra Baxter, Steven Anderson, Ann Marshall, and Donald M. Baer

The acquisition of interrogative verbal behavior is a key skill in the development of language. Children can use questions to find out innumerable things about their environment and how it works. Early in language development, simple question forms are used to learn referents for objects and actions. The development of question asking in severely retarded children can provide them with an essential skill to learn about the environment on their own, without direct instructions by teachers and therapists. The training of this skill is often a primary target in comprehensive language intervention programs. The purpose of this study is to examine the generalization and maintenance characteristics of this behavior for nine severely retarded institutionalized children.

The nine experimental subjects were initially taught to ask "What's that?" when novel stimuli were presented to them as part of a comprehensive language training intervention program. To train this response, the therapist presented two or more objects to the child. The child was required to say "What's that?" to the novel objects, and label the objects he/she already knew. This skill was taught using modeling and differential reinforcement. Several months after the skill was trained, each child was probed for the response. The probe consisted of the experimenter holding up a brown paper bag in front

of the child. The bag contained a reinforcer. If the child asked "What's that?" when the bag was presented, he received the reinforcer. If he failed to respond in a reasonable length of time, the probe was halted. All nine children were probed in this manner, but only two of the children asked "What's that?" when the bag was presented. These two children demonstrated both generalization and maintenance of the question-asking behavior. The other seven children were then presented with a second probe within the multiple baseline design. In the second probe, the children first observed a peer model the correct response. While the child was seated in a small room, the peer entered the room, asked "What's that?" when the experimenter held up the brown paper bag, and then received the reinforcer inside the bag. The peer model then immediately left the room, and the bag was held up in front of the child. Of the remaining seven children, two successfully displayed the "What's that?" behavior and generalized this behavior back to the first probe condition. In this condition, the five subjects were briefly retrained to appropriately display the "What's that?" behavior by their language trainer. Each subject received one to three sessions of training until they displayed the response appropriately. The five subjects were then reprobed in the modeling condition and all five displayed the behavior appropriately. Next, they were reprobed under the original probe conditions with no model. All five generalized to this condition also.

The results of this study support other reports showing that generalization and maintenance frequently do not result from therapeutic interventions. Only two of the nine subjects displayed maintenance of the question-asking behavior although all nine had been successfully trained to criterion initially. Of the remaining seven, two were successfully retrained simply by providing a brief model of the appropriate behavior while the other five required an additional retraining condition before generalizing to the probe conditions. These results are both encouraging and discouraging. The poor maintenance is obviously disheartening although skill retention is a well-recognized problem for severely retarded individuals. On the encouraging side, the target skill was easily and inexpensively retrained for seven of the subjects. This emphasizes the impact that training reviews may have in facilitating generalization and maintenance. Occasional maintenance and generalization training over time may insure acquisition of the trained response while complete discontinuation of training when the child initially reaches criterion may eventually contribute to extinction of the target behavior in the child's repertoire.

# FINAL REPORT ABSTRACT

## The Use of the Verbatim Code As A Continuous Assessment Device-Determining Training Content and Strategies

by

Kathleen Stremel-Campbell


The realization of Public Law 94-142 has forced teachers and specialists to take a more critical view of the assessment-acquisition process. Stokes and Baer (1977) state that a therapeutic behavioral change, to be effective, often must occur over time, persons, and settings, and the effects of that change sometimes should spread to a variety of related behaviors. Therefore, the measurement of the effects of training or of generalization also should become a major component of the intervention process. The generalization of language behavior is especially necessary in our culture since our environment expects that language occur across a wide range of conditions. In order to facilitate generalization, we must actively program generalization within our training; and in order adequately to target functional language behaviors, we must actively assess what language behaviors are and are not present in the student's spontaneous language. Yet, standardized language tests often do not provide adequate information to make decisions concerning the selection of entry behaviors, training content, or training strategies. They may provide only a limited and somewhat sterile view of the student's language abilities. The same measurement tool used to determine if generalization has occurred can be used as an active, continuous assessment. The purpose of this study is to analyze verbatim language samples to determine training content and strategies in actively programming for generalization.

Six experimental subjects were selected on the following basis: two subjects used minimal language representing group A, two subjects used syntactic constructions representing Group B, and two subjects used grammatical morphemes representing Group C. Standardized tests and previous training reports were used for subject selection. Pre-training baselines were administered for each group of subjects and the verbatim observational code was concurrently used to assess each subject's language in a non-training setting (classroom). The verbatim data was continuously collected throughout the training period and across related non-training language behaviors. Three basic questions were asked relevant to the long-term data base:

1. Are there differences between the training baseline and the generalization baseline?
2. Are there differences between the acquisition of the behavior in the training setting and the generalization of that behavior in the non-training settings.
3. Are there differences between generalization and the durability of generalization.
4. Are there occurrences of related linguistic behaviors during training.

Table 1 represents the occurrence of targeted and related language behaviors across three different stages of language programming. Both Group A subjects used nouns in the pretest training baseline, but only Subject 1 demonstrated use of nouns in his spontaneous language in a non-training setting. Since a pretest showed that verbs were absent in both training and non-training settings, Subject 1 was placed in structured training at the verb level; whereas Subject 2 was placed in sequential modification in noun training. Both Group B subjects demonstrated no use of verb-noun combinations in the pretest training baseline or the generalization baseline. Therefore, both Subjects 3 and 4 were placed in a structured verb-noun training program. Group C students demonstrated no use of 'Wh is/are questions' within a structured pretest, but Subject 5 infrequently used 'Wh is/are questions' in non-training settings. Group C students were placed in a "loose-training" program in which they received positive consequences when they initiated 'Wh is/are questions' and correction if they used 'Wh questions' but omitted the is/are grammatical morpheme.

Five of the subjects met training criteria and ~~five~~ of the subjects used their trained language response in the non-training setting. However, there were acquisition-generalization differences within two subjects' data. Subject 3 showed increases in his generalization data even though his training data suggested poor performance. His structured program and future programs were trained within a "loose training" model. Subject 4 met training criterion but did not show evidence of generalization until a sequential modification procedure was initiated.

The durability of generalization was assessed three months after training criterion was met. All of the subjects maintained generalization over time, but showed differences in the degree of maintaining. Three of the subjects (2, [illegible] and 6) showed a decrease in generalization across time. However, this decrease seemed to reflect the current programming. If the student was currently being programmed in a language behavior that was highly related (a direct expansion) such as the Verb-Noun, Verb-Noun-Verb sequence, the generalization of that behavior increased during the next level of training. Subjects 5 and 6 had completed is/are training across three different structures and were being trained within an unrelated language behavior.

Only Subjects 3 and 4 showed generalization of related, non-trained behaviors. Again, their training involved structures which were highly related; that is, direct expansions; whereas the language behaviors trained to Subjects 5 and 6 were related only on the basis of the common morphological marker.

The data demonstrate that there are differences between the training and generalization baseline and the training and generalization acquisition and that those differences cannot be predicted without the use of a continuous generalization measurement. The differences between generalization and the durability of generalization seemed to be related to the type of current language programming. The data seem to indicate that only highly related language behaviors may occur to some degree before training is initiated.

The use of the verbatim code from the onset of the assessment-acquisition-generalization process allowed us to make individual programmatic decisions concerning what to train and possibly how to train. The verbatim data analysis also prevented us from making false assumptions in regard to the student's spontaneous language.

Table 1

The Occurrence of Target and Related Language Behaviors Across Subjects and Settings

Group A - One-Word Response

Subject 1

| Nouns | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Present | Not needed | | Present |
| Generalization | Present | | | Present |

| Verbs | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Absent | Structured* | Not needed | Present |
| Generalization | Absent | Present | | Present |

Subject 2

| Nouns | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Present | | Initiate * | Present |
| Generalization | Absent | | Present | Decreased |

| Verbs | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Absent | | | |
| Generalization | Absent | | | |

Group B - Syntactic Construction

Subject 3

| Verb-Noun | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Absent | Structured | Not needed | Present |
| Generalization | Absent | Present | | Present |

Table 1 (continued)

| Noun-Verb-Noun | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Limited | Loose * | Initiate * | |
| Generalization | Limited | | | |

Subject 4

| Verb-Noun | Pre-Training | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Absent | Structured* | Initiated | Present |
| Generalization | Absent | Absent | Present | Present |

| Noun-Verb-Noun | Pre-Training | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Limited | To be initiated | | |
| Generalization | Limited | | | |

Group C - Grammatical Morphemes

Subject 5

| Wh is/are | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Absent | Loose * | Maintain | Present |
| Generalization | Limited | Present | Concurrent w/Is/Are Reversal | Decreased |

| Is/Are Reversal | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Limited | To be initiated | | |
| Generalization | Absent | | | |

Subject 6

| Wh is/are | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Absent | Loose * | Maintain concurrent | Present |
| Generalization | Absent | Present | Wh Is/Are Reversal | Decreased |

Table 1 (continued)

| Is/Are Reversal | Pretest | Acquisition | Sequential Modification | Post-Training |
|---|---|---|---|---|
| Training | Absent | To be initiated | | |
| Generalization | Absent | | | |

# The Generalized Effects of Productive Labelling Training Involving Common Object Classes

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A major issue in the development of language training programs for language deficient children is how to teach children to generalize new responses to novel stimuli within the same class, and to respond in a variety of settings and with a variety of persons. The few studies relevant to the problem of language generalization have been concerned with programming generalization across settings (e.g., Griffiths & Craighead, 1972), across persons (e.g., Garcia, 1974), and across novel stimuli within the same response class (e.g., Schumaker & Sherman, 1973). The purpose of the present study was to replicate and extend the findings of earlier studies to include an analysis of generalization to novel examples of common objects within the same object class. For example, if a subject is trained to label a bowl characterized by particular stimulus properties, will the child provide the same label when shown bowls differing across one or more irrelevant properties? Consistent with earlier studies, this study contained two components: (a) a demonstration of incomplete generalization; and (b) a demonstration of a procedure to program generalization when it is incomplete.

A second purpose of this study was to investigate whether behavior demonstrated in one response modality would generalize to another response modality. Suppose, for example, that a subject demonstrates by match-to-sample that several common objects are members of the same class. Then a new response, e.g., a verbal label, could be conditioned for one example of the class, and other members of the class then could be expected to fall under the control of, or control, the same verbal label. Two studies (Dixon & Spradlin, 1976; Spradlin & Dixon, 1976) support this expectation. A similar relationship may also exist between receptive language and productive speech, however, relevant studies refute this hypothesis (Guess, 1969; Guess & Baer, 1973). The current study attempted to examine again each of the above possibilities and to extend previous findings to include an analysis of productive labelling and with common objects.

METHOD

Subject and setting. John, a 16-year-old male resident in a state institution for developmentally delayed children, participated in this research. His mental age as measured by the Merrill-Palmer was 3 years, 10 months; his AAMD classification was profound retardation.

Object classes. Six groups of objects were chosen that were common in the subject's daily living environment. Six examples were chosen to represent each group, each reflecting various properties of shape, color, size and material. Table 1 provides a list of the six classes and a description of their examples.

Tasks

Match-to-sample. A match-to-sample assessment phase occurred prior to productive labelling training. The ability to respond to experimental stimuli in a conceptual manner would suggest that the subject recognized the essential property defining each class.

Productive labelling. Immediately following the match-to-sample and receptive labelling (described later) assessment phase, productive labelling training was introduced. Productive labelling was the behavior targeted for experimental training and analysis.

(i) Experimental design and training. A multiple baseline design across object classes served to demonstrate experimental control. The study proceeded through a series of alternations between training and probes for generalization resulting from that training (see Figure 1). Initially, the subject was tested to determine any tendency to produce the correct class label before training. Following these initial baseline measures, the experimenter began concurrent training with one example from each of two object classes. After criterion performance was achieved with each example, the reinforcement schedule was changed and probes were introduced to determine the extent of generalization to untrained examples. If generalization was absent or partial, the experimenter began training a second example from each of the current training classes. This pattern of probing and then adding one additional training example continued until satisfactory generalization occurred. After each successful demonstration of generalization, training began with the next one or two training classes.

(ii) Productive labelling probes. A probe sequence occurred immediately following each training sequence to determine the extent of generalization resulting from current training conditions. The generalization probe pool was composed of five examples from the same class as the current training example(s).

Receptive labelling. The subject's ability to identify receptively the experimental stimuli was assessed in a series of sessions prior to productive labelling training and after each successful demonstration of generalization within the productive modality.

## RESULTS

### Tasks

Match-to-sample. Table 2 demonstrates the subject's performance on non-identical match-to-sample problems for each experimental class. He responded correctly on 83% of the trials, suggesting that he recognized the essential property defining each of the classes.

Productive labelling. The percent of correct trials during training and maintenance conditions are represented by dashes and dots, respectively, in Figure 2. The bars demonstrate the generalization and maintenance of productive labels to nontraining stimuli as a percentage of total presentations. A single training example was not sufficient to produce high levels of generalization to nontraining examples for four of the six experimental classes. However, each successive addition of one training example generally produced a systematic increase in the level of generalization.

Receptive probes. Figure 3 demonstrates the subject's performance on the receptive probes. These data suggest that the subject was unable to identify experimental objects receptively prior to productive training; and, as productive labelling progressed, there were no systematic changes in the accuracy of responses in the receptive modality.

DISCUSSION

Several implications for language training are apparent from the results of this investigation: (a) Behavior demonstrated in one response modality may not be reflected in another response modality. Although the subject demonstrated in a match-to-sample task that he could classify experimental stimuli nonverbally, he failed sometimes to demonstrate the same classification skills in productive labelling. Similarly, productive speech appeared to function independent of receptive language in the acquisition of class labels; (b) The generalization of productive labels may not occur automatically and, in fact, may have to be programmed; (c) One method of programming generalized labelling is to train sufficient examples. That is, if the result of teaching one example of a stimulus class is merely the mastery of the example taught, with no generalization to other members of the class, then continue to teach examples until the proper induction is formed (Stokes & Baer, 1977); (d) The number of examples sufficient to produce generalization may vary. Although not explicitly analyzed in this study, it is reasonable to suppose that the diversity of properties reflected by the examples chosen for training may affect the extent of generalization.

In summary, this study indicates that direct training on those behaviors that children need would benefit them far more than training on an independent class of behavior, expecting such training to generalize. Thus, a careful analysis of generalization both within and across response modalities is essential to insure that training is complete.

References

Dixon, M. & Spradlin, J. Establishing stimulus equivalences among retarded adolescents. Journal of Experimental Child Psychology, 1976, 21, 144-164.

Garcia, E. The training and generalization of a conversational speech form in nonverbal retardates. Journal of Applied Behavior Analysis, 1974, 7, 137-149.

Griffiths, J. & Craighead, W. E. Generalization in operant speech therapy for misarticulation. Journal of Speech and Hearing Disorders, 1972, 37, 485-494.

Guess, D. A functional analysis of receptive language and productive speech: Acquisition of the plural morpheme. Journal of Applied Behavior Analysis, 1969, 2, 55-64.

Guess, D. & Baer, D. M. An analysis of individual differences in generalization between receptive and productive language in retarded children. Journal of Applied Behavior Analysis, 1973, 6, 311-329.

Schumaker, J., & Sherman, J. A. Training generative verb usage by imitation and reinforcement procedures. Journal of Applied Behavior Analysis, 1970, 3, 273-287.

Spradlin, J. E., & Dixon, M. H. Establishing conditional discriminations without direct training: stimulus classes and labels. American Journal of Mental Deficiency, 1976, 80, 555-561.

Stokes, T. F., & Baer, D. M. An implicit technology of generalization. Journal of Applied Behavior Analysis, 1977, 10, 349-367.

Table 1

List of the Six Experimental Classes and a Description of Training and Probe Examples in Each

| OBJECT CLASSES | | CONDITION | DESCRIPTION | | | |
|---|---|---|---|---|---|---|
| | | | Size | Color | Material | Other Descriptors |
| Car | 1 | Tr. | medium | green | plastic | Mustang |
| | 2 | Probe | small | yellow | metal | dune buggy |
| | 3 | Probe | small | yellow | metal | Volkswagon |
| | 4 | Probe | small | red | plastic | Porche |
| | 5 | Probe | medium | green | foam | Jeep |
| | 6 | Probe | large | yellow | plastic | Gremlin |
| Bowl | 1 | Tr. | small | orange | plastic | round |
| | 2 | Probe | large | black | plastic | round |
| | 3 | Probe | small | orange | glass | round |
| | 4 | Probe | small | yellow | plastic | round |
| | 5 | Probe | medium | white | plastic | round |
| | 6 | Probe | medium | brown | metal | rectangular |
| Hat | 1 | Tr. | large | orange | plastic | hard hat |
| | 2 | Tr. | small | red | cloth | baseball hat |
| | 3 | Tr. | medium | black | cloth | cowboy hat |
| | 4 | Tr. | medium | white | cloth | sailor's hat |
| | 5 | Probe | medium | green | vinyl | bill & flaps |
| | 6 | Probe | medium | brown | knit | stocking hat |
| | 7 | Probe | large | white | cloth | cowboy hat |
| | 8 | Probe | medium | gray | cloth | sporting hat |
| | 9 | Probe | medium | tan | straw | straw hat |
| Doll | 1 | Tr. | small | blue | plastic | girl |
| | 2 | Tr. | medium | yellow | plastic | girl |
| | 3 | Tr. | medium | yellow | cloth | dog |
| | 4 | Tr. | small | yellow | plastic | baby |
| | 5 | Tr. | medium | pink | cloth | bear |
| | 6 | Probe | medium | green | cloth | dog |
| | 7 | Probe | medium | red | plastic | baby |
| | 8 | Probe | large | white | cloth | dog |
| | 9 | Probe | medium | red | cloth | rag doll |
| | 10 | Probe | large | tan | plastic | baby: no clothing |

Continued on next page

| | | | | | |
|---|---|---|---|---|---|
| Shoe 1 | Tr. | small | white | canvas | tennis shoe |
| 2 | Tr. | medium | brown | canvas | slipper |
| 3 | Tr. | medium | white | canvas | tennis shoe |
| 4 | Probe | medium | black | vinyl | girl's shoe |
| 5 | Probe | small | black | vinyl | baby's shoe |
| 6 | Probe | large | white | canvas | tennis shoe |
| 7 | Probe | small | white | leather | baby's shoe |
| 8 | Probe | large | blue | leather | lady's shoe |
| Book 1 | Tr. | small | blue | paper | 5 X 5 X ½ |
| 2 | Tr. | large | yellow | hard | 9 x 13 x ¼ |
| 3 | Tr. | small | white | paper | 6 X 9 X ½ |
| 4 | Probe | small | white | paper | 4 X 7 X ½ |
| 5 | Probe | large | red | paper | 8 X 11 X ¼ |
| 6 | Probe | medium | orange | hard | 5 X 8 X 1 |
| 7 | Probe | large | blue | hard | 9 X 9 X ¼ |
| 8 | Probe | medium | yellow | hard | 7 X 8 X ¼ |

Figure 1. Flow diagram of baseline, training, and probe conditions during productive labelling training.

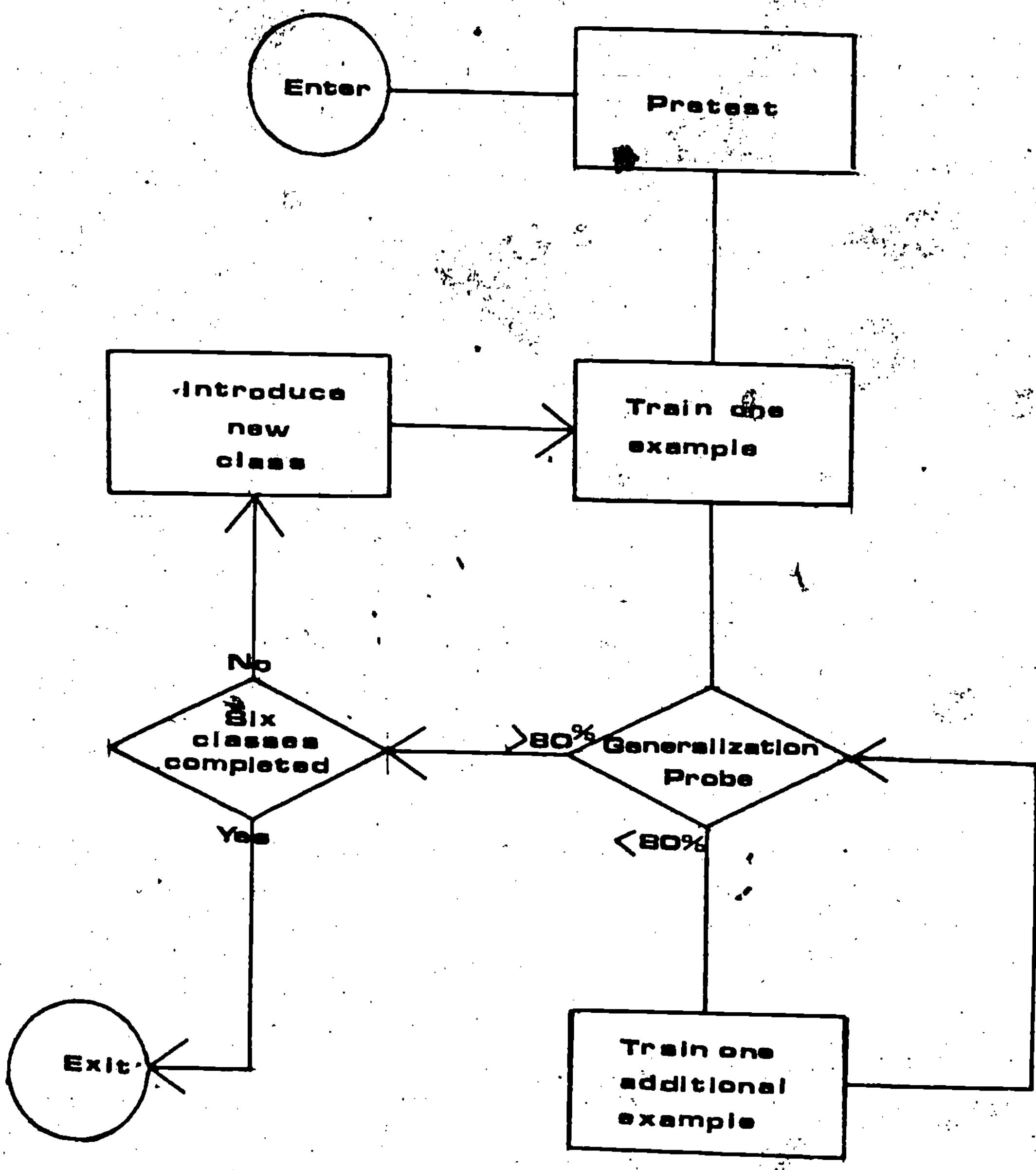
Enter
Pretest
Introduce new class
Train one example
No
Six classes completed
>80%
Generalization Probe
Yes
<80%
Exit
Train one additional example

Figure 1

Table 2

Match-to-sample Performance for John

Prior to Productive Labelling Training

| Object Class | Percent Correct Across All Sessions |
|---|---|
| car | 100 |
| bowl | 87 |
| hat | 91 |
| doll | 91 |
| shoe | 93 |
| book | 95 |
| | Average percent correct: 93 |

Figure 2. Percentage of trials correct during each experimental condition of productive labelling training. Solid lines represent the percentage of correct responses during training sessions; dotted lines represent the percentage of correct responses during maintenance sessions; and, the bars depict generalization to non-training stimuli as the percentage of total presentations. Dashed lines note the points at which training occurred.

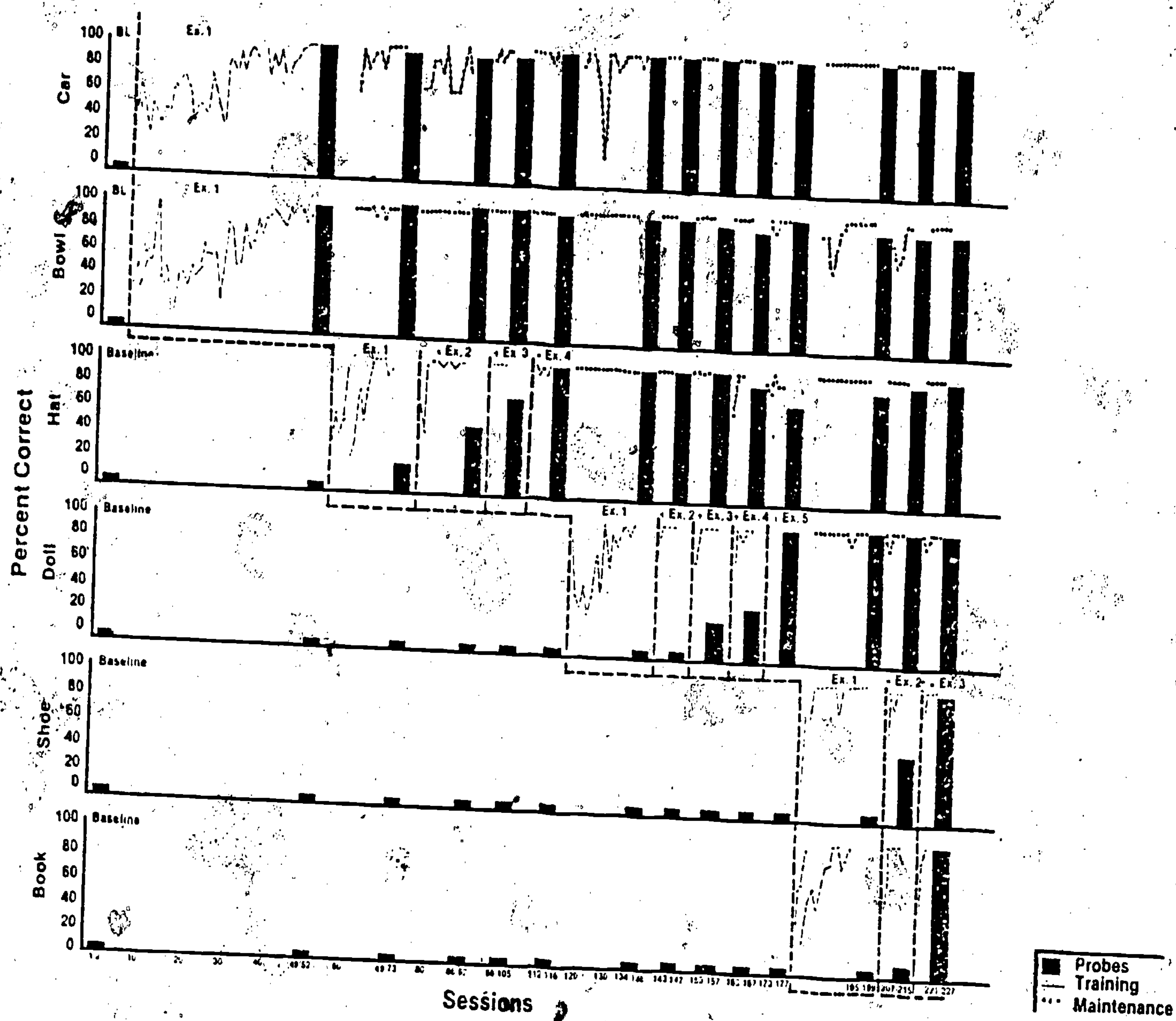
Percent Correct
Car
Bowl
Hat
Doll
Shoe
Book
BL
Baseline
Ex. 1
Ex. 2
Ex. 3
Ex. 4
Ex. 5
Sessions
Probes
Training
Maintenance

Figure 2

Figure 3. Percent of ~~correct~~ responses to receptive probes conducted before and after each demonstration of generalization within the productive modality. Solid bars represent the percent of correct responses to a constant sample of two stimuli from each class; open bars represent the percent of correct responses to those stimuli previously involved in productive labelling training. The dashed line represents the point at which productive labelling training occurred for each class.

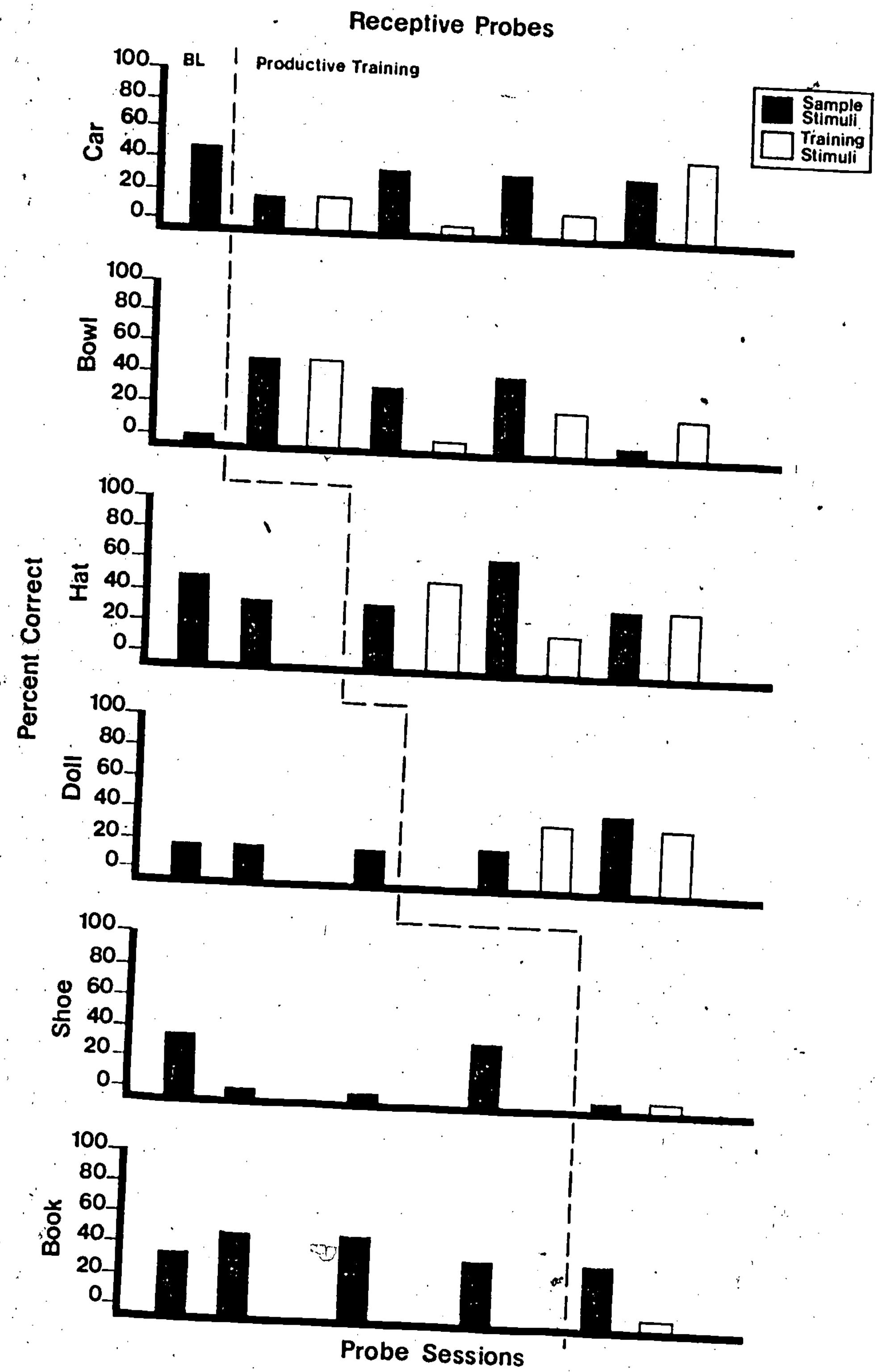


Figure 3

AHW

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APPENDIX VIII

Environmental Intervention Abstracts

# Teacher Verbal Interactions with Developmentally Disabled and Nondisabled Preschool Children

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The process of language acquisition in children has been the focus of a significant amount of research, particularly in recent years. A number of reserachers have investigated the effects of environmental variables on language development, especially mothers' verbal input to young language-learning children. Little research has been conducted on how teachers interact with children in the classroom. The purpose of this investigation was to examine the nature of the verbal interactions of teachers to developmentally disabled and nondisabled preschool children in a reverse mainstreamed classroom. The speech of two preschool teachers to four disabled (MLU less than or equal to 1.5) and four nondisabled (MLU = 2.9 - 4.3) preschool children was examined. Teacher speech was recorded on a dual cassette tape recorder using FM-Telemetry over a four week period. Teacher and child discourse was recorded on channel one of the tape, supplemented with contextual descriptions by the experimenter on a second channel. Verbatim typewritten transcriptions of teacher-child discourse and contextual comments were prepared from the recordings. Teacher speech was analyzed according to 19 variables. Child speech was classified into 5 categories, including unintelligible utterances. Interaction patterns were analyzed along three main parameters: (1) similarities and differences in teacher speech according to linguistic level of the child; (2) inter-teacher differences within each child level; and (3) similarities and differences in child speech according to linguistic level. As was expected, the two groups of children differed markedly in their speech and language performance. It was concluded that the two groups of children were exposed to a different linguistic environment. Nondisabled children received more total teacher utterances, more requests for verbal responses, and more spontaneous conversation than disabled children. Behavior requests, directives and instructions were more frequent with disabled children. Ratios of teacher-to-child utterances were substantially higher for the disabled children. The nature of these differences suggest that the child's behavior directly influences his language environment.

TABLE 1.--Examples of teacher interaction variables to developmentally disabled and non-disabled preschool children.

| Teacher Behavior | Child | Teacher |
|---|---|---|
| Expansion | Water | It is water. |
| Expaitation | A squirrel | See his big bushy tail. |
| Direct Imitation | A flower. | A flower. |
| Request for verbal response | ----- | What do you like to wear? |
| Behavior request | ----- | Can you hang up your coat? |
| Directive/Instruction | -----<br>----- | Go put your doll away.<br>This piece belongs here. |
| Conversational Comment | I sang on T.V. | You have such a pretty voice. |
| Description of on-going behavior | (circle) | Yeah, Micki is seeing herself in the mirror. |
| Self-expatiation | ----- | (We didn't talk about David.)<br>1. David has light brown hair.<br>2. And its curly. |

TABLE 1.--(cont'd)

| Teacher Behavior | Child | Teacher |
|---|---|---|
| Sequential repetition | ----- | (We need to check throat.)<br>1. We need to check throat.<br>2. Time to check throat.<br>3. Need to check throat. |
| Self-answered question | ----- | (Did you get a new hair cut?)<br>Yes, you did. |
| Verification of child Response | I'm singing. | Yes, you're singing. |
| Expatiation + question | I got a flower. | Is that a shamrock flower? |
| Expansion + question | Got a fire on it. | It has a fire on it? |
| Imitation + question | Take the skin off. | Take the skin off? |
| Reduction | I'm wearing a red dress. | Red dress. |
| Answer to child question | What are you doing? | I'm going to sit down here and talk. |
| Verbal prompt | ----- | Say hair.<br>Hair.<br>Say it. |
| Description of response/ response attempt | (unintelligible "ba")<br>(unintelligible.....) | Yes, that's a ball.<br>Oh, you want your overalls. |

TABLE 2.--Comparison of child speech variables by percent, based on total child responses (intelligible and unintelligible speech).

| Child Speech | high-level | low-level |
|---|---|---|
| Spontaneous | 51.1 | 4.1 |
| Elicited | 39.7 | 20.7 |
| Imitative | 4.8 | 4.5 |
| Total intelligible responses | 95.8 | 29.3 |
| Unintelligible-acknowledged | 2.9 | 24.8 |
| Unintelligible-unacknowledged | 1.2 | 45.7 |
| Total unintelligible responses | 4.1 | 70.6 |

TABLE 3.--Comparison of total number of utterances by Teacher 1 and Teacher 2 according to individual child and linguistic level.

| | H1 | H2 | H3 | H4 | Total | L1 | L2 | L3 | L4 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 904 | 284 | 190 | 483 | 1861 | 319 | 111 | 98 | 402 | 930 |
| T2 | 764 | 335 | 182 | 346 | 1627 | 493 | 149 | 700 | 270 | 1612 |
| Total | 1668 | 619 | 372 | 829 | 3488 | 812 | 260 | 798 | 672 | 2542 |

TABLE 4.--Comparison of teacher speech variables (T1 + T2) by percent to developmentally disabled and nondisabled preschool children.

| Teacher Speech | high-level | low-level |
|---|---|---|
| Request for verbal response | 30.0 | 19.1 |
| Conversational comment | 12.7 | 9.7 |
| Description of on-going behavior | 5.6 | 7.7 |
| Direct imitation | 5.4 | .8 |
| Directive/Instruction | 4.7 | 24.3 |
| Behavior request | 4.6 | 7.7 |
| Self-expatiation | 4.2 | 5.3 |
| Self-answered question | 1.2 | 2.8 |
| Sequential repetition | 1.0 | 10.5 |
| Expatiation | 8.2 | - |
| Verification of child response | 5.7 | - |
| Expatiation + question | 4.2 | - |
| Answer to child question | 4.0 | - |
| Imitation + question | 4.0 | - |
| Expansion | 2.4 | - |
| Reduction | .9 | - |
| Expansion + question | .5 | - |
| Verbal prompt | - | 5.9 |
| Description of response/ response attempt | - | 4.4 |

Quantity and Quality of Teacher's Vocabularies Addressed To Developmentally Disabled and Nondisabled Preschool Children

Thomas M. Longhurst and Janet B. Elmore

Kansas State University

There has been considerable recent research interest in the speech of adults addressed to children. Most of the investigators have focused on mother's speech and there has been relatively few investigations of teacher speech. The purpose of the present investigation was to analyze the quality and quantity of teacher's vocabulary directed to developmentally disabled and non-disabled preschool children. Answers for several questions were sought; 1) Are there specific differences in quality and/or quantity of teacher's vocabularies addressed to disabled and non-disabled children? 2) Does the proportion of vocabulary addressed to individual children differ? 3) Are certain adjustments in teachers vocabulary typical of specific classroom situations?

Two teachers and eight children, four disabled and four non-disabled, served as the subjects for this study. Throughout the five-week study, effort was made to avoid altering the environment existing at the preschool. Teacher speech was monitored and recorded through the use of an FM telemetry system. Each teacher had the opportunity to interact with the children daily in any of four classroom situations. The first situations was an unstructured free-play activity, in which the children could be interacted with individually or in small groups. The second situation was called circle, and involved a group discussion time in which all children participated. Tablework was the third activity, and consisted of one teacher interacting with one child in the teaching of pre-academic skills. The fourth classroom situation was a snack-time, in which all adults and children participated. Three analyses were used to assess the teachers vocabularies; 1) total number of words, 2) Carroll type-token ratio, and 3) a comparison of unique words with the Thorndike-Lorge list of the 1000 most frequent words.

Results indicated that teacher vocabulary to the non-disabled children was greater in quantity and quality than that addressed to the children in the disabled group. Considerable differences in total number of words and CTTR were noted in teachers speech to the two groups. Only small differences between groups were found for comparisons of unique words with the Thorndike-Lorge list. Additionally, there were large differences among the proportions of total teacher speech addressed to individual children, with one child receiving nearly three times more discourse than the child who received the next largest amount of teacher speech. Specific adjustments in teacher's vocabulary were also found to be typical of the four classroom situations, with the unstructured free-play situation containing the largest amount of discourse and most diverse teacher vocabulary.

Table 1

Total Number of Words Spoken to Each Child by Teacher, With Group Totals

| | Teacher 1 | Teacher 2 | Total |
|---|---|---|---|
| Non-disabled Children | | | |
| 1 | 9,137 | 7,815 | 16,952 |
| 2 | 2,648 | 3,576 | 6,224 |
| 3[a] | 3,047 | 1,786 | 4,833 |
| 4 | 2,715 | 3,038 | 5,753 |
| Mean per Child | 4,387 | 4,054 | 8,441 |
| Non-disabled Group | 17,547 | 16,215 | 33,762 |
| Disabled Children | | | |
| 1 | 2,159 | 4,018 | 6,177 |
| 2 | 888 | 1,068 | 1,956 |
| 3 | 1,430 | 3,937 | 5,367 |
| 4 | 3,856 | 1,846 | 5,702 |
| Mean per Child | 2,083 | 2,717 | 4,801 |
| Disabled Group | 8,333 | 10,869 | 19,202 |

[a] Subject 3 of the non-disabled group was absent from the pre-school for an entire week of the data collection period.

Table 2

Percentage by Teacher of the Total Number of Words Spoken to Each Child, With Group Totals

| | Teacher 1 | Teacher 2 | Total |
|---|---|---|---|
| Non-disabled Children | | | |
| 1 | 35.0% | 29.0% | 32.0% |
| 2 | 10.0% | 13.0% | 12.0% |
| 3 | 12.0% | 7.0% | 9.0% |
| 4 | 10.0% | 11.0% | 11.0% |
| Non-disabled Group | 68.0% | 60.0% | 64.0% |
| Disabled Children | | | |
| 1 | 8.0% | 15.0% | 11.5% |
| 2 | 3.0% | 4.0% | 3.5% |
| 3 | 6.0% | 15.0% | 10.0% |
| 4 | 15.0% | 7.0% | 11.0% |
| Disabled Group | 32.0% | 40.0% | 36.0% |

Table 3

Total Number of Words Spoken to Each Child and Percentage of the Total for Each Group of Children in Each of Four Classroom Situations

| | Free-Play | Snack | Tablework | Circle |
|---|---|---|---|---|
| Non-disabled Children | | | | |
| 1 | 10,907 (31)[a] | 582 (4) | 2,660 (17) | 2,803 (23) |
| 2 | 4,044 (21) | 151 (5) | 1,197 (8) | 832 (12) |
| 3 | 3,330 (15) | 178 (3) | 897 (7) | 428 (6) |
| 4 | 2,814 (20) | 292 (3) | 1,203 (6) | 1,444 (13) |
| Non-Disabled Group | 21,095 | 1,203 | 5,957 | 5,507 |
| Percentage TNW | 40% | 2% | 11% | 10% |
| Disabled Children | | | | |
| 1 | 3,222 (23) | 320 (5) | 2,027 (6) | 608 (14) |
| 2 | 1,488 (13) | 0 | 18 (2) | 450 (10) |
| 3 | 2,419 (13) | 0 | 2,545 (5) | 403 (9) |
| 4 | 3,851 (19) | 183 (4) | 1,013 (7) | 655 (15) |
| Disabled Group | 10,980 | 503 | 5,603 | 2,116 |
| Percentage TNW | 21% | 1% | 11% | 4% |

[a] Indicates the total number of samples addressed to each child in each situation, out of a possible 32 total samples over the four-week period.

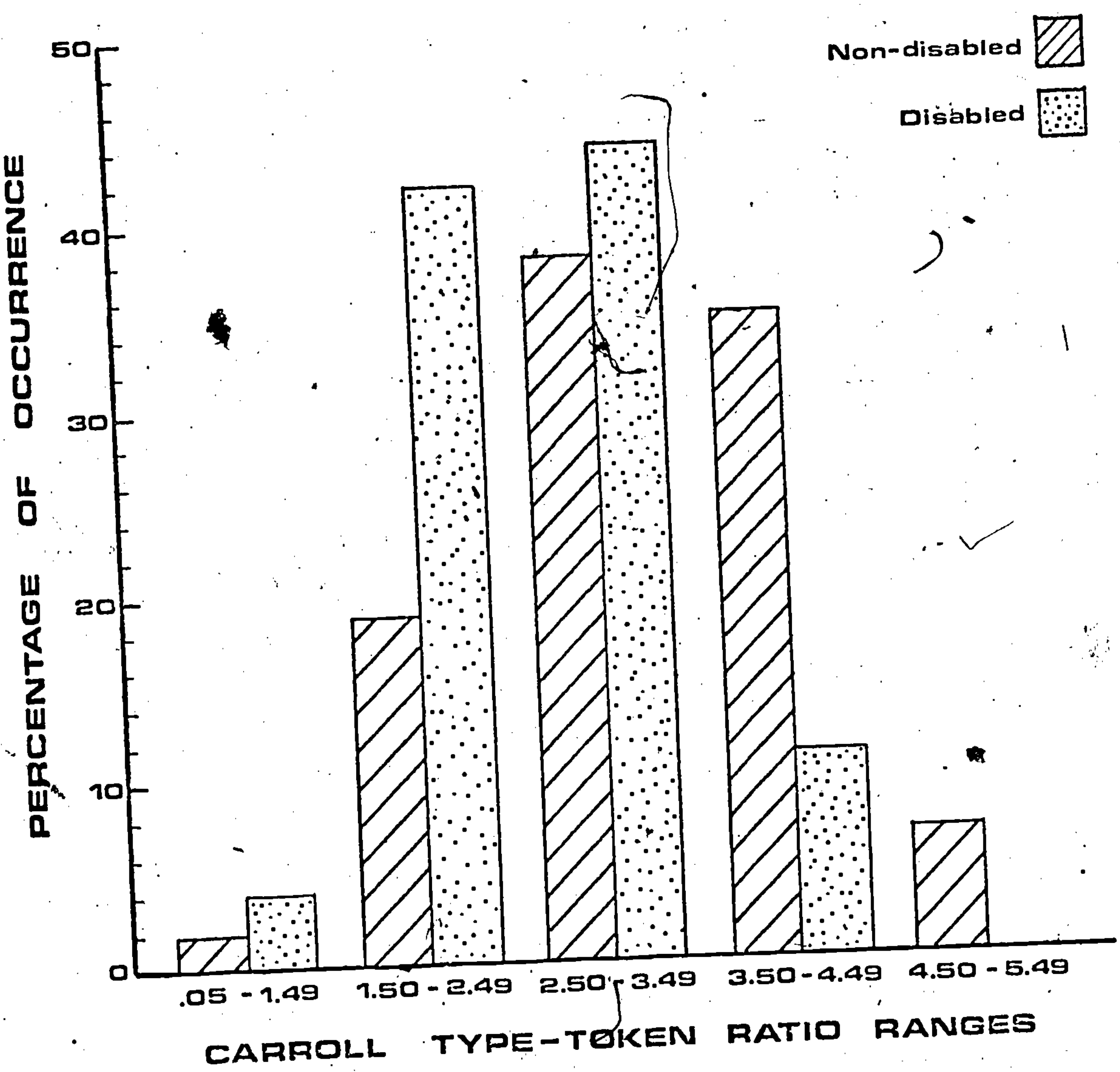



Figure 4

Percentage of Occurrence in Carroll Type-Token Ratio Ranges for Disabled and Nondisabled Groups

Table 4

Mean CTTR for Each Child & Group in Each of the Four Classroom Situations

| | Free-Play | Snack | Tablework | Circle |
|---|---|---|---|---|
| Non-disabled Children | | | | |
| 1 | 4.63 (31)[a] | 4.06 (4) | 3.99 (12) | 4.30 (20) |
| 2 | 4.33 (18) | 2.91 (4) | 3.78 (5) | 3.40 (8) |
| 3 | 4.49 (12) | 3.50 (3) | 3.83 (6) | 3.59 (5) |
| 4 | 4.49 (18) | 4.10 (3) | 3.90 (6) | 3.91 (11) |
| Non-disabled Group | 4.49 | 3.64 | 3.88 | 3.80 |
| Disabled Children | | | | |
| 1 | 3.99 (19) | 3.14 (4) | 4.02 (5) | 3.42 (7) |
| 2 | 3.91 (11) | b | c | 2.92 (7) |
| 3 | 3.29 (9) | b | 2.90 (4) | 2.83 (7) |
| 4 | 3.87 (19) | 2.99 (4) | 3.66 (6) | 3.14 (8) |
| Disabled Group | 3.77 | 3.07 | 3.53 | 3.08 |

[a] Indicates the total number of samples containing 25 words or more addressed to each child in each situation.

[b] Teachers did not talk to subjects 2 and 3 of the disabled group at all during snack, over the four-week period.

[c] Subject 2 of the disabled group did not receive sufficient teacher speech to compute CTTR.

Table 5

Mean Percentage of Occurrence of Unique Words on the Thorndike-Lorge List of 1,000 Most Frequent Words

| | Non-disabled | Disabled |
|---|---|---|
| Children | | |
| 1 | 83.26 | 82.37 |
| 2 | 80.25 | 82.96 |
| 3 | 83.09 | 80.38 |
| 4 | 80.92 | 82.93 |
| Total | 81.88 | 81.93 |

An Analysis of Two Naturally Covarying Behaviors:
Activity Level and Inappropriateness

Ann Rogers-Warren

Kansas Neurological Institute

and

University of Kansas

In the present study, an ecological analysis of two wards of a state institution for the severely and profoundly retarded was made to determine how selected elements of the wards affected residents' behavior. Specifically, an examination was made of the effects of number of staff, and type of activity of residents and staff members, on activity level and rate of inappropriate behavior by the children.

Fourteen children living on one ward (A) and 14 children living on a second ward (B), and their respective staffs, were observed. Ten observations were made of each ward, during each of its specific activities (a total of 50 observations).

In both wards, freetime observations were made during the morning when no specific activities were planned for the children. Program observations were made during the period of time specifically assigned for working on small-motor and pre-academic tasks. During the program, two to four children worked on these tasks with a staff member, ususally while seated at a table. Food reinforcement for appropriate behavior was always available in both wards during program time. Freetime observations and program observations lasted approximately 45 minutes each, and playground observations about 30 minutes. Observations were made during the same time each day.

Children were observed for two types of behavior: level of activity, and inappropriateness. Three levels of activity, (1) isolate, (2) adjacent, and (3) interacting, were defined in terms of the child's proximity and degree of interaction with materials and/or peers. Inappropriate behaviors included tantruming, self-stimuluation, hitting, biting, and other acts of aggression.

Observations were made by scanning the children present in the area, looking at each child for 10 sec. and then recording the child's behavior during the next 5 sec., until all children present had been scanned. This cycle was repeated as often as time allowed.

These observations showed that across all settings, the amount of inappropriate behavior by the residents decreased as the activity level rose. That is, as the children engaged in more interactions with peers and materials, the number of incidents of agression, self-stimulation, and tantruming decreased. The subjects on Ward A showed consistently less inappropriate behavior than the children on Ward B; however, in both cases inappropriateness was inversely related to activity level of the residents.

Insert Figure 1 here

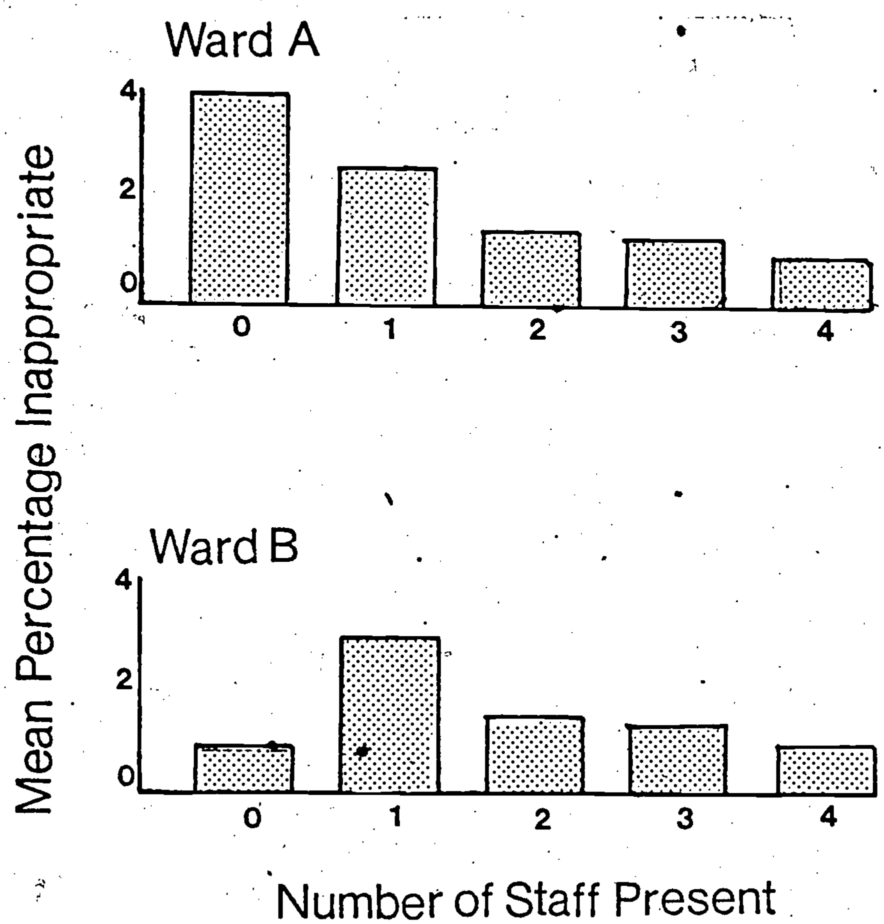
Inappropriate behavior also appeared to be affected by the number of adults present in the setting. As more staff entered the setting, the number of inappropriate behaviors decreased, as shown in Figure 2.

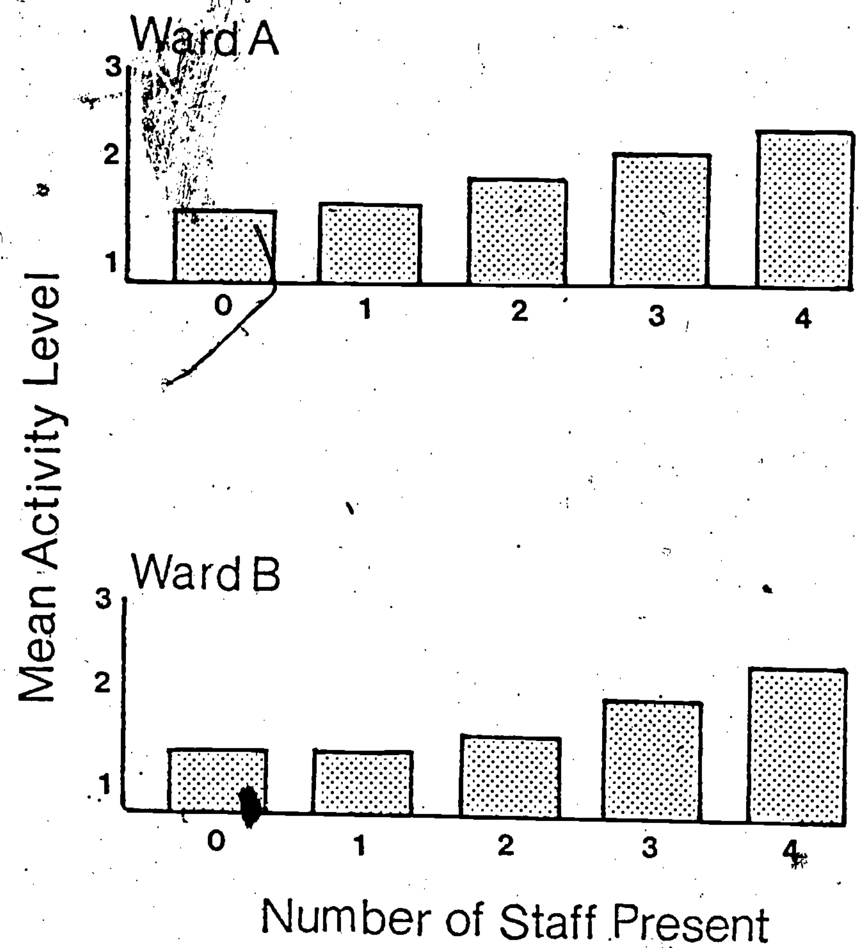
Insert Figure 2 here

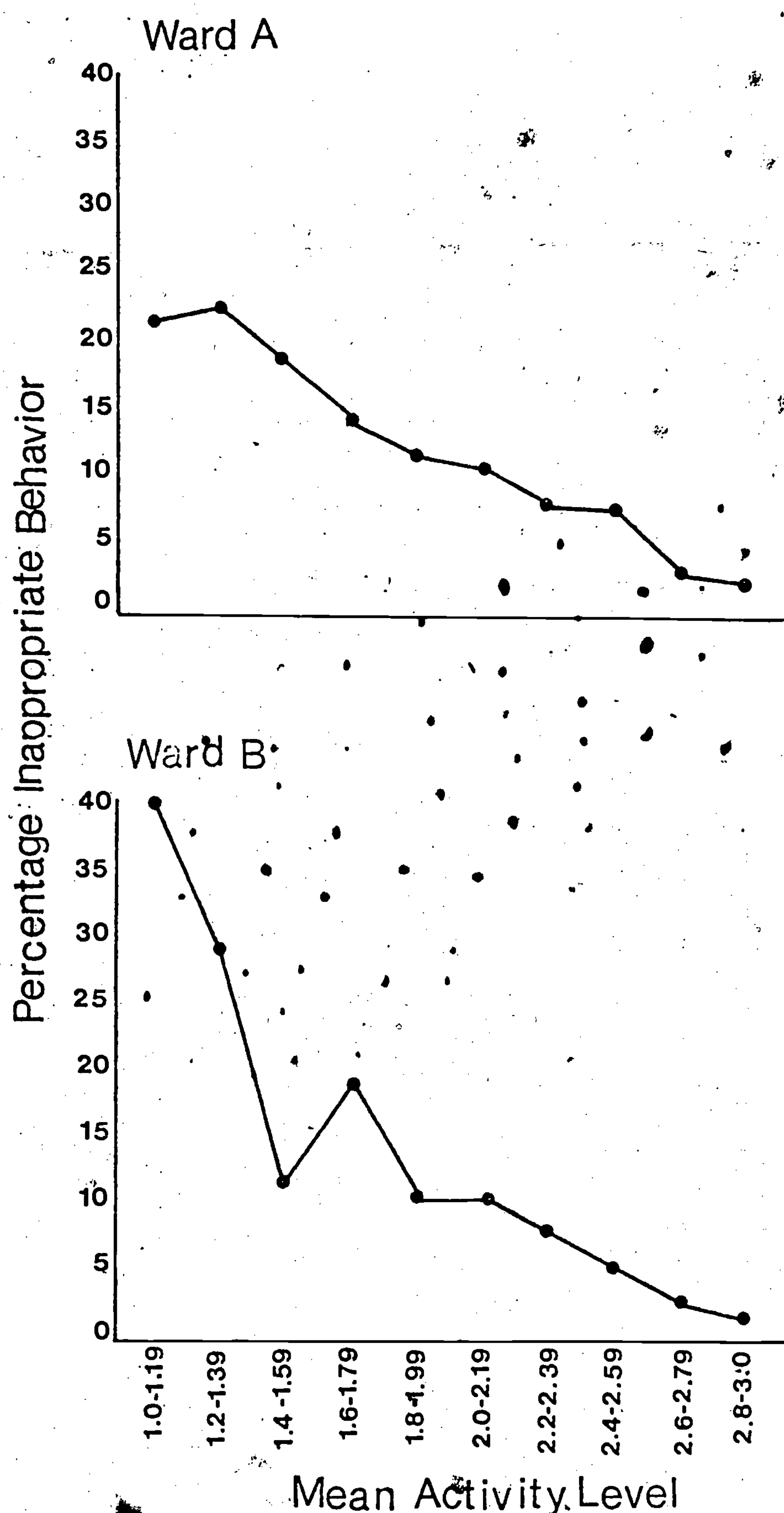
Also, as the number of adults in the setting increased, the mean activity level tended to increase. By definition, increase interaction levels indicated more child-to-child and child-to-material interactions, not adult-to-child interactions. Typically, when one or two staff members were present, the children were isolate. They sat on the floor or the furniture, staring into space or dozing. On a scale of 1-3, their activity level was about 1.4. During the program period, there were usually four staff present, and activity level averaged about 2.5 of a possible score of 3.

Insert Figure 3 here

These results suggest that the traditional belief that small child-staff ratios are valuable is a valid one. Further research analyzing why increasing the number of staff members alters behavior is necessary. The effects of increasing the number of staff are straightforward, but application of the lesson may not be possible. Although it is clear that more staff will increase residents' activity levels while decreasing their inappropriate behaviors, few institutions can afford to provide several aides for each ward on a continuing basis. Providing structured activities and carefully distributing staff time across children within the setting may be more practical.


Ward A
Ward B
Mean Percentage Inappropriate
Number of Staff Present
4
2
0
0
1
2
3
4


Ward A
3
2
1
0
1
2
3
4
Mean Activity Level
Ward B
3
2
1
0
1
2
3
4
Number of Staff Present


Ward A
Ward B
Percentage Inappropriate Behavior
40
35
30
25
20
15
10
5
0
1.0-1.19
1.2-1.39
1.4-1.59
1.6-1.79
1.8-1.99
2.0-2.19
2.2-2.39
2.4-2.59
2.6-2.79
2.8-3.0
Mean Activity Level

# Teachers' Interrogations to Developmentally Disabled and Nondisabled Preschool Children

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Over the last several years there has been a tremendous increase of of interest in adult's speech to children. This input has been recognized for the large role it plays in children's language development. From previous studies we have learned how parents speak to children and how they adjust their communicative style. However, little research has been conducted concerning how other adults, namely teachers, adjust their verbalizations to children of different linguistic levels. The purpose of the current study was to describe interrogations addressed to developmentally disabled and nondisabled preschool children by preschool teachers in a reverse mainstreamed classroom. The subjects included four disabled children, four nondisabled children and two teachers of a preschool for developmentally disabled children. Developmental language level for the two groups of children was determined in order to establish that the children represented two distinct linguistic levels. Data were recorded on a dual channel cassette tape recorder over four weeks. Both the teacher being observed and the investigator wore vests equipped with concealed microphones and transmitters. While teacher speech was recorded on one channel of the tape, the investigator recorded any contextual cues received by the child on the second channel. After the interrogations were drawn from the protocols, they were classified into eight predetermined question type categories. These categories stressed the language level response requested from the child. The children's responses were also classified into five categories. Thus, the teacher's questions were regarded as appropriate or inappropriate to the linguistic level of the children based on the response rate and type of response by the children. The investigation revealed that there were relatively small differences in teacher interrogations to disabled and nondisabled children. Interrogative styles to both groups of children could be further adjusted to more appropriately address the language capabilities of the children. By analyzing children's responses to specific adult input, it is possible to recognize what types of adjustment should occur. Direct intervention targets concerning adult's linguistic input to children are readily identifiable.

Table 1

Definitions and Examples of Each Question Type Category

| Question Type | Definition | Examples |
|---|---|---|
| Behavior Request | Behavior request given in interrogative form. No verbal response required, only compliance. | "Would you open the door?" |
| Yes/No Question | Demand simply a yes/no response of head nod. Tag questions were included if they could not be classified as behavior request. | "Do you like kittens?" "He's small, isn't he?" |
| Noun/Noun Phrase | No information beyond a noun or noun phrase label is required. | "What's that?" |
| Verb/Verb Phrase | No information beyond a verb or verb phrase label is required. | "What are you doing?" |
| Alternative Questions | Gives the child a choice of responses. Alternative questions subsume noun and verb phrase label questions. | "Was she happy or sad?" |
| Informational Questions | Request information that may be beyond the noun or verb phrase label. More open ended and provide various degrees of choice. | "Why is he doing that?" |
| Maintenance Questions | Remarks encourage the child to go on talking. Subsume all other categories. | "Did he really say that?" |
| Clarification Questions | Speaker not sure he heard correctly, or did not understand what was meant. Also included repetitions of all or part of child's previous utterance said in rising inflection. | "What?" "Huh?" |

Table 2

Percentage of Occurrence of Each Routine
Type for Two Groups of Children

| Routine Type | Disabled Group | Nondisabled Group |
|---|---|---|
| Downward | 6.1 | 5.0 |
| Neutral Low | 73.9 | 57.9 |
| Neutral Mid | 8.7 | 15.6 |
| Neutral High | 8.3 | 16.5 |
| Upward | 2.4 | 4.5 |
| Mixed | .3 | 1.5 |

Table 3

Per centage of Occurrence of Each Interrogation Category to Each Child and the Two Groups

| | Behavior Request | Yes/No Question | Noun Phrase Question | Verb Phrase Question | Alternative Question | Information Question | Maintenance Question | Clarification Question |
|---|---|---|---|---|---|---|---|---|
| Disabled Children | | | | | | | | |
| 1 | 40.5 | 32.6 | 11.0 | 2.7 | .1 | 9.3 | 0 | 3.4 |
| 2 | 33.3 | 31.0 | 12.4 | 5.4 | 0 | 6.2 | 0 | 1.5 |
| 3 | 39.8 | 39.0 | 5.6 | .4 | .4 | 8.1 | 0 | 6.5 |
| 4 | 47.6 | 35.5 | 5.0 | .8 | 0 | 10.0 | 0 | .8 |
| <u>Disabled Group</u> | <u>37.8</u> | <u>36.8</u> | <u>8.9</u> | <u>2.1</u> | <u>.1</u> | <u>10.6</u> | <u>0</u> | <u>3.3</u> |
| Nondisabled Children | | | | | | | | |
| 1 | 14.4 | 38.4 | 14.2 | 1.3 | 1.4 | 19.8 | .2 | 9.8 |
| 2 | 25.8 | 36.9 | 12.3 | 1.0 | .7 | 11.6 | .1 | 11.1 |
| 3 | 19.3 | 33.2 | 15.0 | .8 | 1.8 | 15.2 | 1.6 | 12.8 |
| 4 | 17.8 | 38.6 | 14.8 | 0 | 1.0 | 18.0 | 1.2 | 10.0 |
| <u>Nondisabled Group</u> | <u>17.8</u> | <u>38.5</u> | <u>12.2</u> | <u>.9</u> | <u>1.3</u> | <u>17.4</u> | <u>.6</u> | <u>10.9</u> |

Table 4

Percentage of Occurrence of Each Response Category in Regard to Interrogation Category by Disabled and Nondisabled Groups

| | | | | | |
|---|---|---|---|---|---|
| Disabled Group | | | | | |
| Behavior Request | 2.5 | 8.6 | 2.2 | 0 | 86.5 |
| Yes/No Questions | 7.7 | .2 | 1.6 | 0 | 90.3 |
| Noun Phrase Quest. | 23.0 | 0 | .9 | 0 | 75.9 |
| Verb Phrase Quest. | 8.0 | 0 | 0 | 0 | 92.0 |
| Alternative Quest. | 0 | 0 | 0 | 0 | 100.0 |
| Information Quest. | 5.6 | 0 | .8 | 0 | 93.4 |
| Maintanence Quest. | 0 | 0 | 0 | 0 | 0 |
| Per. of Occ. Across all Categories | 6.7 | 3.3 | 1.7 | 0 | 88.1 |
| Nondisabled Group | | | | | |
| Behavior Request | .9 | 33.9 | 18.6 | .7 | 45.6 |
| Yes/No Questions | 1.7 | .4 | 45.0 | 2.8 | 50.0 |
| Noun Phrase Quest. | 2.3 | .3 | 64.8 | 3.5 | 29.0 |
| Verb Phrase Quest. | 0 | 0 | 47.8 | 4.3 | 47.8 |
| Alternative Quest. | 3.2 | 0 | 67.7 | 6.4 | 22.5 |
| Information Quest. | .7 | .7 | 53.4 | 4.2 | 40.8 |
| Maintanence Quest. | 0 | 0 | 46.6 | 6.6 | 46.6 |
| Per. of Occ. Across all Categories | 1.4 | 6.9 | 45.3 | 2.9 | 43.3 |

# Environments of the Language Delayed: Some Comparisons and Their Implications

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Four research settings were examined to compare rates of verbal interactions between adults and children of differing language abilities. Language-delayed, moderately retarded, severely retarded, and Down's syndrome children, as well as their teachers, served as subjects. Differences in the physical, academic, and social environments are discussed in relation to the child's handicap and verbal abilities.

Seven language-delayed children (mean age - 4 yrs.) were observed in a university preschool. Three normal children also attended this preschool and served as models. The physical environment consisted of two adjoining classrooms; one serving as a freeplay area, the other as a training room. Three teachers were available across both rooms. Each room measured 15' x 15' and contained child-size tables and chairs. The freeplay room was equipped with large motor (balls, boxes, etc.) and fine motor (blocks, drawing supplies, etc.) materials. Activities included these materials and role-playing (doctor, fireperson, etc.). Activities in the training room were highly structured and included academic and pre-academic training (counting, labeling, etc.). Social interaction was emphasized in both freeplay and training situations.

The physical setting for three children (mean age - 10 yrs.) placed in an institution for the moderately retarded consisted of two 18' x 24' rooms. Two adults and eight children interacted in both rooms. The structured classroom contained tables, chairs, and academic and pre-academic materials. The unstructured classroom provided television and film viewing, group games, and playground time. Both classrooms emphasized active teaching and interaction between adults and children.

Eleven severely and profoundly retarded children (mean age - 14 yrs.) were observed in both structured and unstructured classrooms. The structured classrooms consisted of an academic classroom (12' x 24') and an art room (9' x 12'). Four children and one adult interacted in such settings. The academic classroom contained academic and pre-academic materials. The art room was supplied with arts and crafts materials and toys. Active teaching occurred in both the academic classroom and art room. The unstructured facilities held 15 children and 2-3 adults. Children in the dining hall (12' x 30') and the living area (12' x 24') were left to custodial care. The dining hall contained tables and chairs and areas for food preparation. The living area housed couches, chairs, sink, refrigerator, and a few toys.

Structured and unstructured activities were also examined for 13 Down's syndrome children (mean age - 4 yrs.) in a preschool setting. Two children and one adult shared an 8' x 10' room during structured activities. Tables, chairs, and pre-academic materials were present and active teaching occurred during the structured time. During unstructured periods two to three children and one adult were placed in an 8' x 15' room. Besides tables and chairs, the room also contained a sandbox and many toys. The adults here served as observers and little interaction between the adults and children occurred.

Figure 1 represents the rate of teacher verbalizations to the child. Across all settings, structured activities doubled the rate of teacher verbalizations as compared to unstructured activities. Primarily, the

2.

teachers increased their question-asking behavior. Lower child response rates might be anticipated as teacher verbalizations increase, but Figure 2 suggests that the opposite is occurring. As obligatory situations increase so does the percentage of response.

Figures 3 and 4 represent the comparisons of child verbalizations and child initiations across structured and unstructured activities. It can be seen that structured activities do increase the rate of child verbalizations (Figure 3). However, Figure 4 suggests that initiations rates are not increased appreciably during structured activities. The increase in obligatory situations and obligatory responses decreases the likelihood of increases in child initiations.

This research suggests that structured activities increase the verbalization rates of language-deviant children. However, separate classes of verbal behavior must be examined. Obligatory speech situations allow an analysis of the child's productive abilities but do not allow the child to display his social initiative behaviors. Researchers of academic environments may do well to examine methods to increase child initiation rates as well as obligatory response rates.

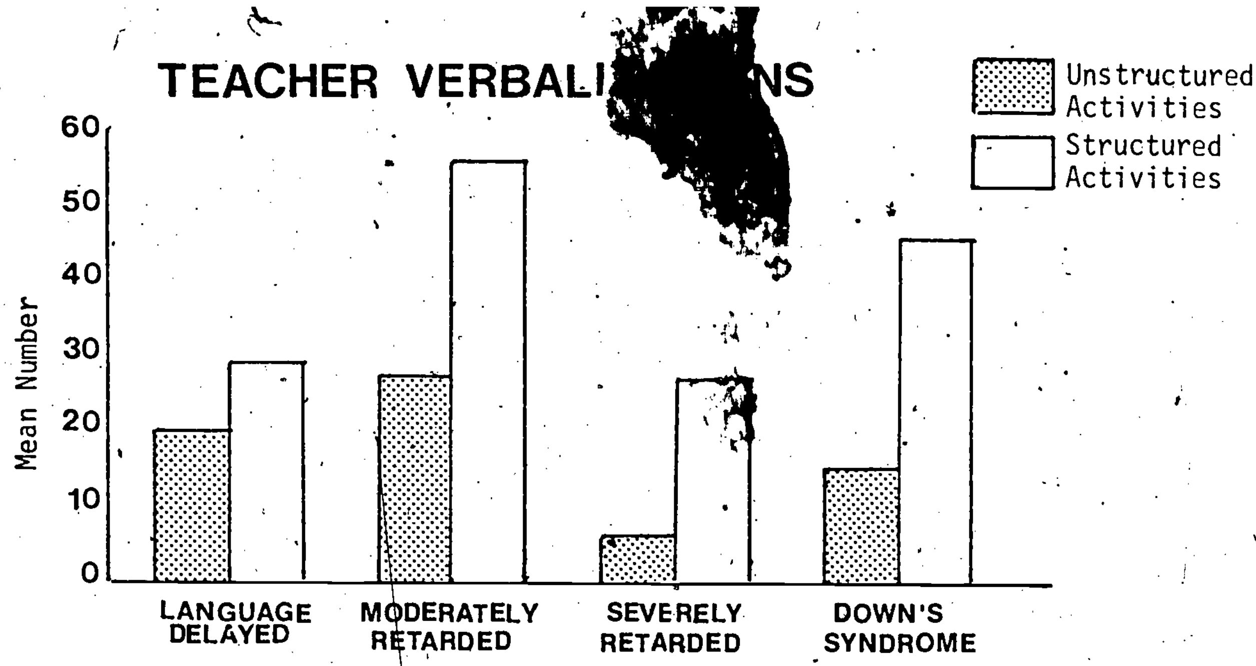

TEACHER VERBALI NS
Unstructured Activities
Structured Activities
Mean Number
60
50
40
30
20
10
0
LANGUAGE DELAYED
MODERATELY RETARDED
SEVERELY RETARDED
DOWN'S SYNDROME

Figure 2

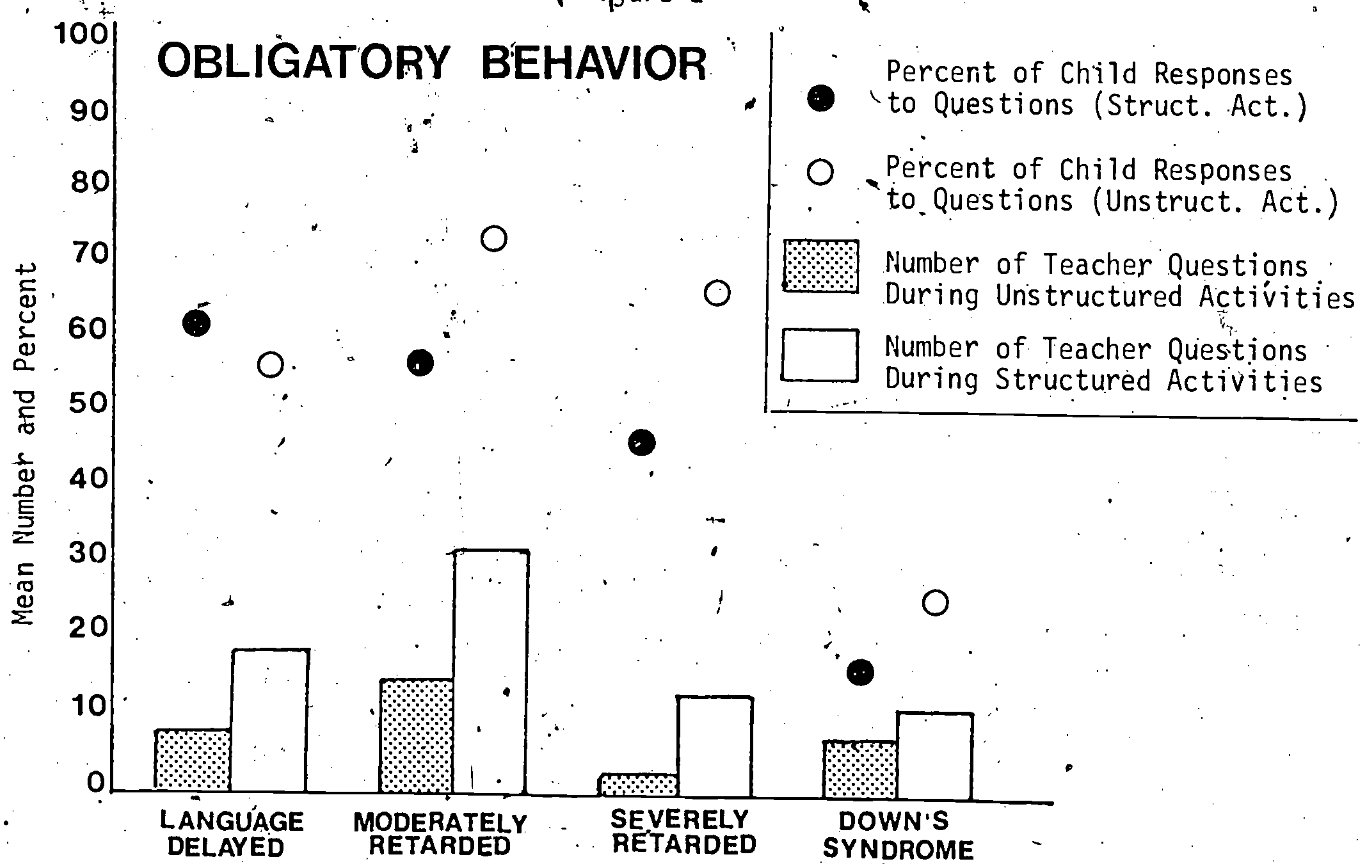

OBLIGATORY BEHAVIOR
Percent of Child Responses to Questions (Struct. Act.)
Percent of Child Responses to Questions (Unstruct. Act.)
Number of Teacher Questions During Unstructured Activities
Number of Teacher Questions During Structured Activities
Mean Number and Percent
100
90
80
70
60
50
40
30
20
10
0
LANGUAGE DELAYED
MODERATELY RETARDED
SEVERELY RETARDED
DOWN'S SYNDROME

Figure 3

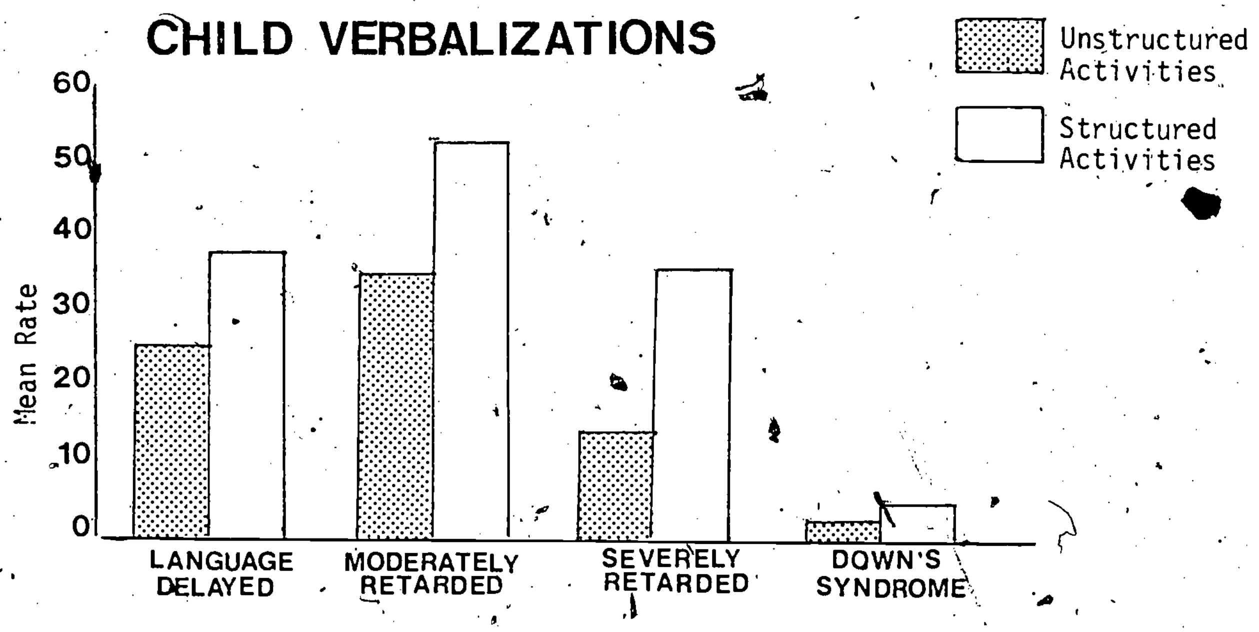
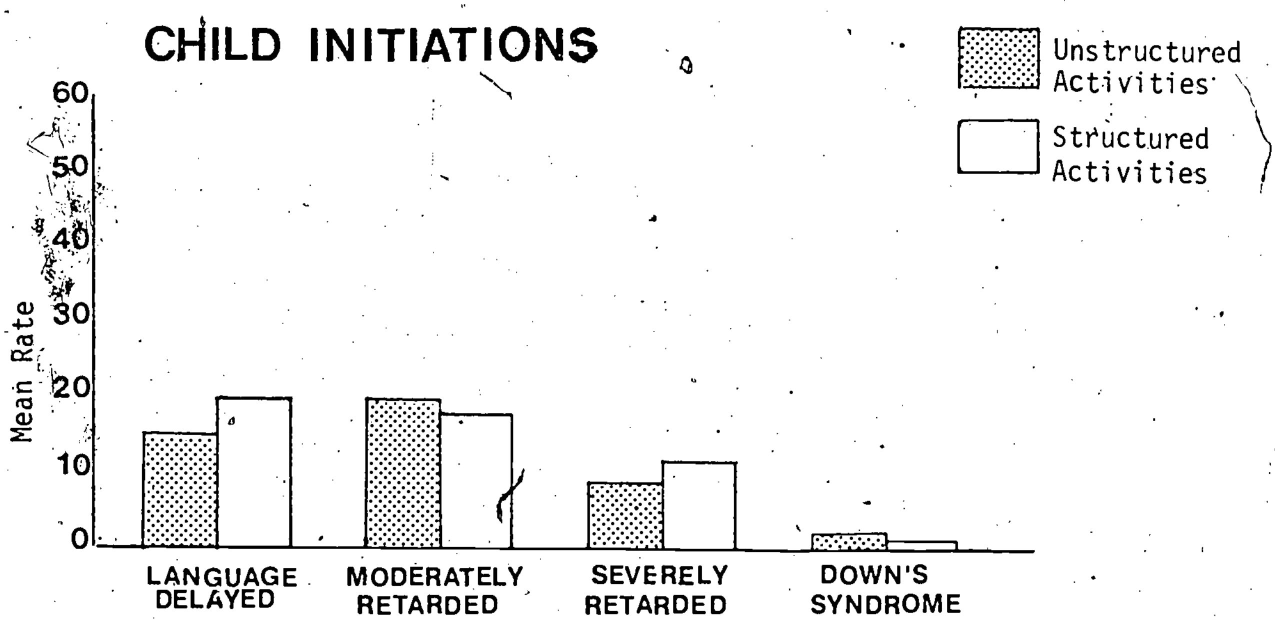



Figure 4



Peer Directed Verbal Interactions In A
Classroom for Language-Delayed Children

Linda Paul

Language Project Preschool

University of Kansas

Mainstreaming or integration of nonhandicapped and handicapped preschoolers is becoming an increasingly common educational practice. Such integration is proposed as a way to provide normalized learning environments and to provide behavioral models for the less skilled children. This investigation was undertaken to examine the effects of such integration with specific reference to language behavior. Specifically, the frequency of verbal interactions between normal and language delayed preschoolers was analyzed.

Methods:

Eleven children enrolled in a special classroom for language delayed children were subjects. The children ranged in age from 3-8 to 6-6 with a mean age of 5-0. Three of the children were normal language models while the remaining children were considered to be language delayed. Children were observed daily for 15 minutes using a 10-second interval code. Speech from peers as well as speech to peers was recorded. In addition, preschool personnel were asked to rank the children according to their overall abilities, social skills and language skills.

Results:

Data from the fall semester indicated that children tended to talk most frequently to those peers judged as being at the same level of language and social ability. In the spring semester, the children talked more frequently to one another. There was more talking across levels of ability.

Table 1 presents subject characteristics in terms of age, rankings and test scores. Table 2 shows the mean number of peer-directed verbalizations in the fall, while Table 3 provides the same information for the spring. Table 4 shows the mean changes in peer talking.

Discussion:

Changes in peer-directed verbalizations may have been due to the increased familiarity of the children with one another, improvements in language ability and the result of an intervention aimed specifically at increasing peer-directed verbal interactions. The data from the spring semester suggest the potential value of preschool integration of non-handicapped and handicapped children.

Table 1

| | | February 1977 | | | | | | May 1977 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rankings[1] | | | Test Scores[2] | | | Rankings | | | Test Scores | | |
| | C.A. | Overall | Social | Language | P.P.V.T. | S.T.A.C.L. | Houston | Overall | Social | Language | P.P.V.T. | S.T.A.C.L. | Houston |
| K.R. | 6-0 | 1 | 1 | 2 | — | — | — | 2 | 1 | 2 | — | — | — |
| M.P. | 5-8 | 2 | 2 | 1 | — | — | — | 1.5 | 1 | 1 | — | — | — |
| M.S. | 5-7 | 3 | 4 | 3.5 | 116 | — | — | 3 | 3 | 3 | — | — | — |
| C.O. | 6-6 | 4 | 3 | 3.5 | 69 | 63 | 5 to 6 | 4 | 3 | 4 | 71 | 88 | 6 |
| B.R. | 6-1 | 5 | 5 | 7 | 65 | 19 | 4 | 5 | 5 | 7 | 87 | 44 | 4 |
| J.P. | 4-5 | 5 | 8 | 5.5 | 94 | — | 4 to 5 | 6 | 6 | 5 | — | 45 | 4 to 5 |
| J.M. | 5-6 | 6 | 7 | 5 | 82 | 90 | 4 to 5 | 6 | 6 | 5.5 | 97 | 50 | 4 to 5 |
| K.J. | 4-2 | 7 | 7 | 7 | — | — | — | — | — | — | — | — | — |
| M.H. | 4-0 | 9 | 9 | 8.5 | 73 | 12 | 3 | 8 | 8 | 8 | 88 | 30 | 3 |
| C.E. | 3-6 | 10 | 10 | 12 | — | — | — | 10 | 10 | 10 | — | — | — |
| M.O. | 5-7 | 11 | 9 | 10 | 59 | 2 | 3 | — | — | — | — | — | — |
| D.B. | 3-8 | 11.5 | 11 | 11 | 60 | below basal | 2 | 9 | 9 | 9 | 63 | below basal | 2 |

[1]Ranking is a modal score

[2]Test Scores are as follows;

P.P.V.T. is Vocabulary/Intelligence Quotient
(Peabody Picture Vocabulary Test)

S.T.A.C.L. is Percentile
(Screening Test for Auditory Comprehension of Language)

Houston is Language Age in Years
(Houston Test of Language Development)

Table 2

Mean Number of Peer Directed Verbalizations
(per 15-minute sample)

Fall 1976

Verbalizations From Children

| From Group \ To Group | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1.8 | 1.7 | 3.2 |
| 2 | 3.1 | 3.2 | 1.6 |
| 3 | 3.5 | 3.1 | 1.8 |

Verbalizations To Children

| From Group \ To Group | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1.4 | 1.5 | 3.2 |
| 2 | 2.9 | 2.7 | 2 |
| 3 | 3.4 | 2.9 | 1.6 |

## Table 3

Mean Number of Peer Directed Verbalizations
(per 15-minute sample)

Spring 1977

Verbalizations From Children

| From Group | To Group 1 | To Group 2 | To Group 3 |
|---|---|---|---|
| 1 | 3.3 | 2.1 | 2.0 |
| 2 | 4.4 | 3.9 | 1.7 |
| 3 | 3.7 | 3.3 | 2.2 |

Verbalizations To Children

| From Group | To Group 1 | To Group 2 | To Group 3 |
|---|---|---|---|
| 1 | 1.6 | 1.2 | 2.0 |
| 2 | 3.5 | 4.0 | 2.1 |
| 3 | 4.4 | 4.0 | 3.7 |

Table 4

Changes in Peer Directed Verbalizations

Mean Changes in Talking to Peers

| | |
|---|---|
| Group 1 | |
| *K. R. | + .9 |
| *M. P. | + .6 |
| *M. S. | +1.6 |
| *C. O. | +2.6 |
| Group 2 | |
| B. R. | - .1 |
| *J. P. | + 1.8 |
| *J. M. | + .8 |
| K. J. | — |
| Group 3 | |
| M. H. | - .1 |
| C. E. | 0 |
| M. O. | — |
| D. B. | +2.7 |

*indicates that the child participated in the intervention designed to increase peer talking.

# Teachers' Responses to the Verbalizations/Vocalizations of Developmentally Disabled Preschool Children

Thomas M. Longhurst and Patricia Brown

Kansas State University

The purpose of this investigation was to describe the nondemanding consequent events following the verbalizations/vocalizations of three developmentally disabled preschool children. The subjects included three male children (ages 4-7, 4-2, and 2-10) and the two teachers of a preschool for developmentally disabled children. Developmental language level, determined by performance on one of two language scales administered to the two preschool teachers, was below the two year age level for all three children. Fifteen, 15-minute observations were conducted at the preschool when a teacher and the target child were engaged in an activity known as "tablework." Verbal/vocal interactions between teachers and the target child were coded and recorded during the 15-minute observation period. Child utterances were coded into one of seven categories, and teacher verbalizations were coded into one of ten consequent event categories. Analysis of teacher-child interaction data revealed that less than 37% of the children's utterances were consequented by teachers. For all three child subjects, the most frequently occurring category of consequences was commentary by the teachers. Teachers consequented the utterances of the two less verbal children more often that the utterances of the most verbal child subject. Expansions of the children's verbalizations comprised 3% or less of the total number of consequent events produced per session by teachers. The teachers produced no simple or complex expatiations as consequences to the children's verbalizations. Generally, these data suggest that preschool teachers consequent the vocal/verbal behavior of the young handicapped children at a very low rate.

Table 1

Categories of Child Utterances and Consequent Events

| Child Utterances | Consequent Events |
|---|---|
| Initiation (I) | Praise for Utterance (+) |
| Response (R) | Praise Not Specifically Related to the Utterance (G) |
| Obligatory Response (Ob) | Negative for Utterance (-) |
| Obligatory Response Required, But Inappropriate Response Made (✓̸) | Corrective Feedback (Cor) |
| Babbling (B) | Acknowledgement (A) |
| Unintelligible Response (~) | Nonverbal Compliance by Teachers (N) |
| | Commentary or Conversation as a Consequent Event (Com) |
| | Exact Imitation (Im) |
| | Expansion (E) |
| | Simple Expatiation (S) |
| | Complex Expatiation (C) |

Table 2

Mean Number of Utterances Per Session and Percent Per Session of the Various Utterance Types for the Three Children

| Child | Mean Number of Child Utterances Per Session | Initiations | Responses | Obligatory Responses | Inappropriate Responses | Babbling | Unintelligible Responses |
|---|---|---|---|---|---|---|---|
| A | 27.25 | 11 | 7 | 10 | 1 | 71 | 0 |
| B | 10.7 | 0 | 0 | 14 | 0 | 85 | 1 |
| C | 17.44 | 4 | 13 | 4 | 0 | 79 | 0 |

Table 3

Mean Percent of Consequent Events Per Session and Percent Per Session of the Various Types for the Three Children

| Child | Mean Percent of Consequent Events Per Session | Praise for Utterance | Negative to Utterance | Corrective Feedback | Nonverbal Compliance | Exact Imitation | Acknowledgement | Expansion | Simple Expatiation | Complex Expatiation | Praise Not Related to Utterance | Commentary |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 24.5 | 0 | 0 | 8 | 0 | 26 | 5 | 3 | 0 | 0 | 23 | 36 |
| B | 53.6 | 0 | 0 | 10 | 1 | 7 | 26 | 1 | 0 | 0 | 27 | 27 |
| C | 32.33 | 0 | 0 | 2 | 0 | 31 | 8 | 2 | 0 | 0 | 6 | 52 |

Table 4

Percentage of Consequences Per Session and Percent Per Session of the Various Types Produced by the Teachers for the Three Children

| Child | Teacher | Percentage of Consequences Per Session | Corrective Feedback | Nonverbal Compliance | Exact Imitation | Acknowledgement | Expansion | Praise Not Related to Utterance | Commentary |
|---|---|---|---|---|---|---|---|---|---|
| A | 1 | 3 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| | 3 | 23 | 0 | 0 | 78 | 11 | 11 | 0 | 0 |
| | 4 | 64 | 12 | 0 | 4 | 0 | 0 | 36 | 48 |
| | 5 | 10 | 0 | 0 | 25 | 25 | 0 | 0 | 50 |
| B | 1 | 29 | 15 | 0 | 0 | 15 | 5 | 50 | 15 |
| | 2 | 34 | 8 | 4 | 8 | 42 | 0 | 21 | 17 |
| | 3 | 13 | 0 | 0 | 0 | 22 | 0 | 33 | 45 |
| | 4 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | 5 | 9 | 33 | 0 | 17 | 33 | 0 | 0 | 17 |
| | 6 | 7 | 0 | 0 | 40 | 20 | 0 | 20 | 20 |
| C | 1 | 67 | 3 | 0 | 46 | 6 | 3 | 3 | 40 |
| | 2 | 27 | 0 | 0 | 0 | 14 | 0 | 7 | 79 |
| | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 33 | 67 |
| | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 5a

Percent Per Session of Categories of Consequent Events Produced by Each Teacher Following the Different Categories of Utterances Produced by Child A

| Teacher | Consequent Event Category | Initiations | Responses | Obligatory Responses | Inappropriate Responses | Babbling |
|---|---|---|---|---|---|---|
| 1 | Exact Imitation | 0 | 0 | 0 | 0 | 3 |
| 3 | Exact Imitation | 18 | 0 | 0 | 0 | 0 |
| | Acknowledgement | 3 | 0 | 0 | 0 | 0 |
| | Expansion | 3 | 0 | 0 | 0 | 0 |
| 4 | Corrective Feedback | 0 | 3 | 0 | 3 | 3 |
| | Exact Imitation | 0 | 0 | 3 | 0 | 0 |
| | Praise Not Related to Utterance | 0 | 0 | 23 | 0 | 0 |
| | Commentary | 0 | 13 | 0 | 0 | 18 |
| 5 | Exact Imitation | 0 | 0 | 0 | 0 | 3 |
| | Acknowledgement | 0 | 0 | 0 | 0 | 3 |
| | Commentary | 0 | 0 | 3 | 0 | 3 |

Table 5b

Percent Per Session of Categories of Consequent Events Produced by Each Teacher Following the Different Categories of Utterances Produced by Child B

| Teacher | Consequent Event Category | Initiations | Responses | Obligatory Responses | Inappropriate Responses | Babbling |
|---|---|---|---|---|---|---|
| 1 | Corrective Feedback | 0 | 0 | 0 | 0 | 4 |
| | Acknowledgement | 0 | 0 | 1 | 0 | 3 |
| | Expansion | 0 | 0 | 1 | 0 | 0 |
| | Praise Not Related to Utterance | 0 | 0 | 0 | 0 | 14 |
| | Commentary | 0 | 0 | 1 | 0 | 3 |
| 2 | Corrective Feedback | 0 | 0 | 0 | 0 | 3 |
| | Nonverbal Compliance | 0 | 0 | 0 | 0 | 1 |
| | Exact Imitation | 0 | 0 | 3 | 0 | 0 |
| | Acknowledgement | 0 | 0 | 0 | 0 | 14 |
| | Praise Not Related to Utterance | 0 | 0 | 0 | 0 | 7 |
| | Commentary | 0 | 0 | 0 | 0 | 6 |
| 3 | Acknowledgement | 0 | 0 | 3 | 0 | 0 |
| | Praise Not Related to Utterance | 0 | 0 | 0 | 0 | 4 |
| | Commentary | 0 | 0 | 0 | 0 | 6 |
| 4 | Commentary | 0 | 0 | 1 | 0 | 4 |
| 5 | Corrective Feedback | 0 | 0 | 0 | 0 | 3 |
| | Exact Imitation | 0 | 0 | 1 | 0 | 0 |
| | Acknowledgement | 0 | 0 | 0 | 0 | 3 |
| | Commentary | 0 | 0 | 0 | 0 | 1 |
| 6 | Exact Imitation | 0 | 0 | 1 | 0 | 1 |
| | Acknowledgement | 0 | 0 | 0 | 0 | 1 |
| | Praise Not Related to Utterance | 0 | 0 | 1 | 0 | 0 |
| | Commentary | 0 | 0 | 0 | 0 | 1 |

Table 5c

Percent Per Session of Categories of Consequent Events Produced by Each Teacher Following the Different Categories of Utterances Produced by Child C

| Teacher | Consequent Event Category | Initiations | Responses | Obligatory Responses | Inappropriate Responses | Babbling |
|---|---|---|---|---|---|---|
| 1 | Corrective Feedback | 0 | 0 | 0 | 0 | 2 |
| | Exact Imitation | 4 | 8 | 10 | 0 | 10 |
| | Acknowledgement | 0 | 4 | 0 | 0 | 0 |
| | Expansion | 2 | 0 | 0 | 0 | 0 |
| | Praise Not Related to Utterance | 0 | 0 | 2 | 0 | 0 |
| | Commentary | 0 | 8 | 0 | 0 | 19 |
| 2 | Acknowledgement | 0 | 2 | 0 | 0 | 2 |
| | Praise Not Related to Utterance | 0 | 0 | 0 | 0 | 2 |
| | Commentary | 0 | 0 | 0 | 0 | 21 |
| 3 | Praise Not Related to Utterance | 0 | 0 | 0 | 0 | 2 |
| | Commentary | 0 | 0 | 0 | 0 | 4 |

# Context Factors Influencing Peer Directed Verbalization Rates

Linda Paul and Ralph J. McQuarter

Language Project Preschool

University of Kansas

The communicative involvement of children with their peers may have an important role in the acquisition of language. And, the extent to which a child talks with peers is dependent upon the child's social and linguistic skills and the skill level of the other children. The present analysis provides a comparison of the rates of peer directed talking in a variety of classrooms. It also presents a comparison of two observational methodologies.

Methods:

Sixty-one preschoolers, enrolled in programs in five different settings, were subjects in the study. The children ranged in age from 2-6 to 6-5 and fifteen of the children were language delayed.

Ten-day samples of the rates of peer directed speech were collected using other 15-minute continuous observations or 5-second scan observations.

Results:

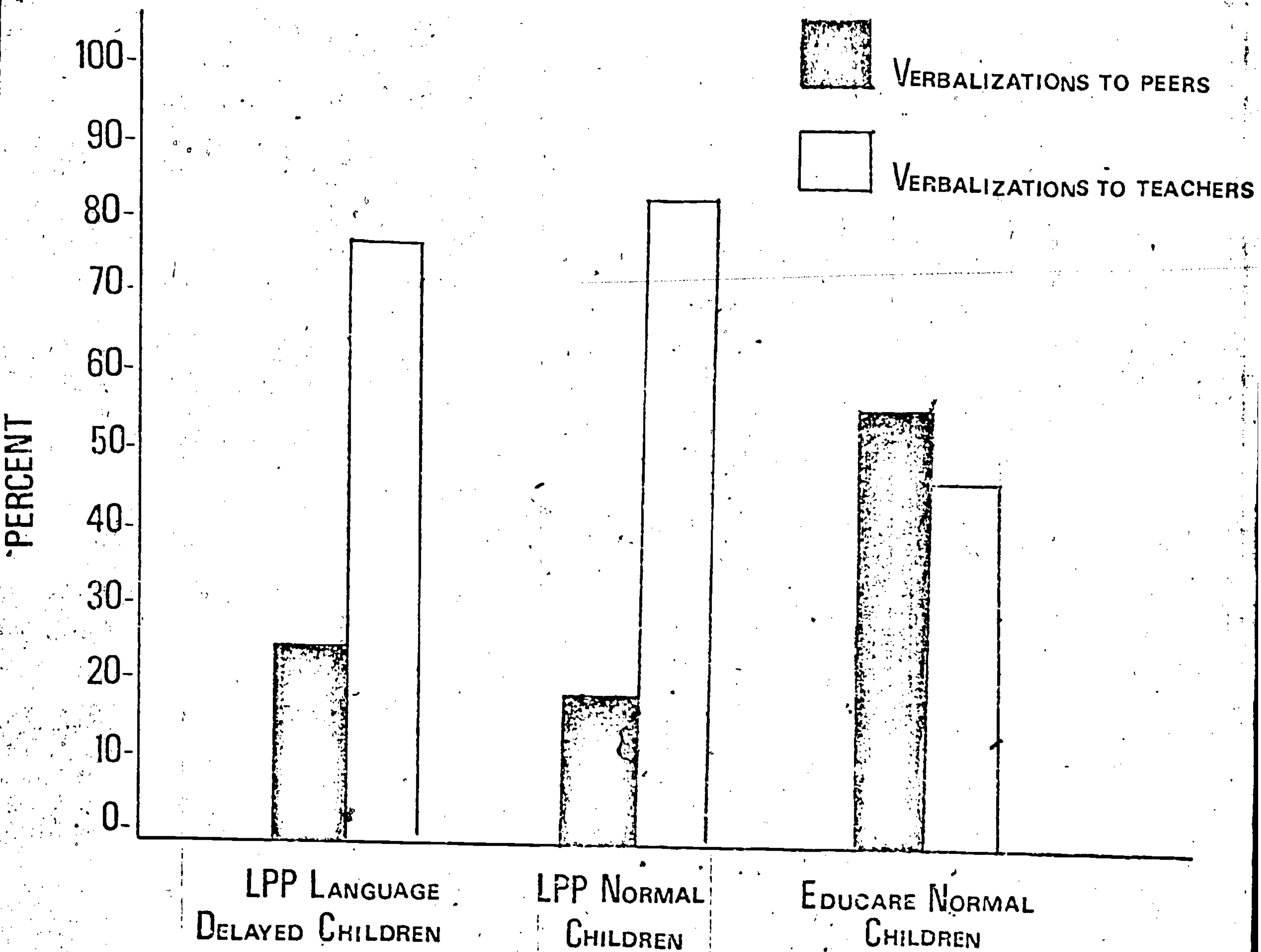
Both kinds of coding schemes pointed to situational and contextual differences in rates of peer directed talking. Normal children in two daycare settings talked more frequently to their peers than did normal children in two preschool settings. But, perhaps the most significant differences were found for children in integrated or mainstreamed classrooms. Three normal children in a classroom with seven language delayed children had lower rates than did normal children in other settings. Two language delayed children talked more frequently to peers in a normal daycare classroom than they did in the classroom with other language delayed children. Teacher verbal input was relatively similar for both normal and language delayed children. Both codes showed similar trends across settings.

Discussion:

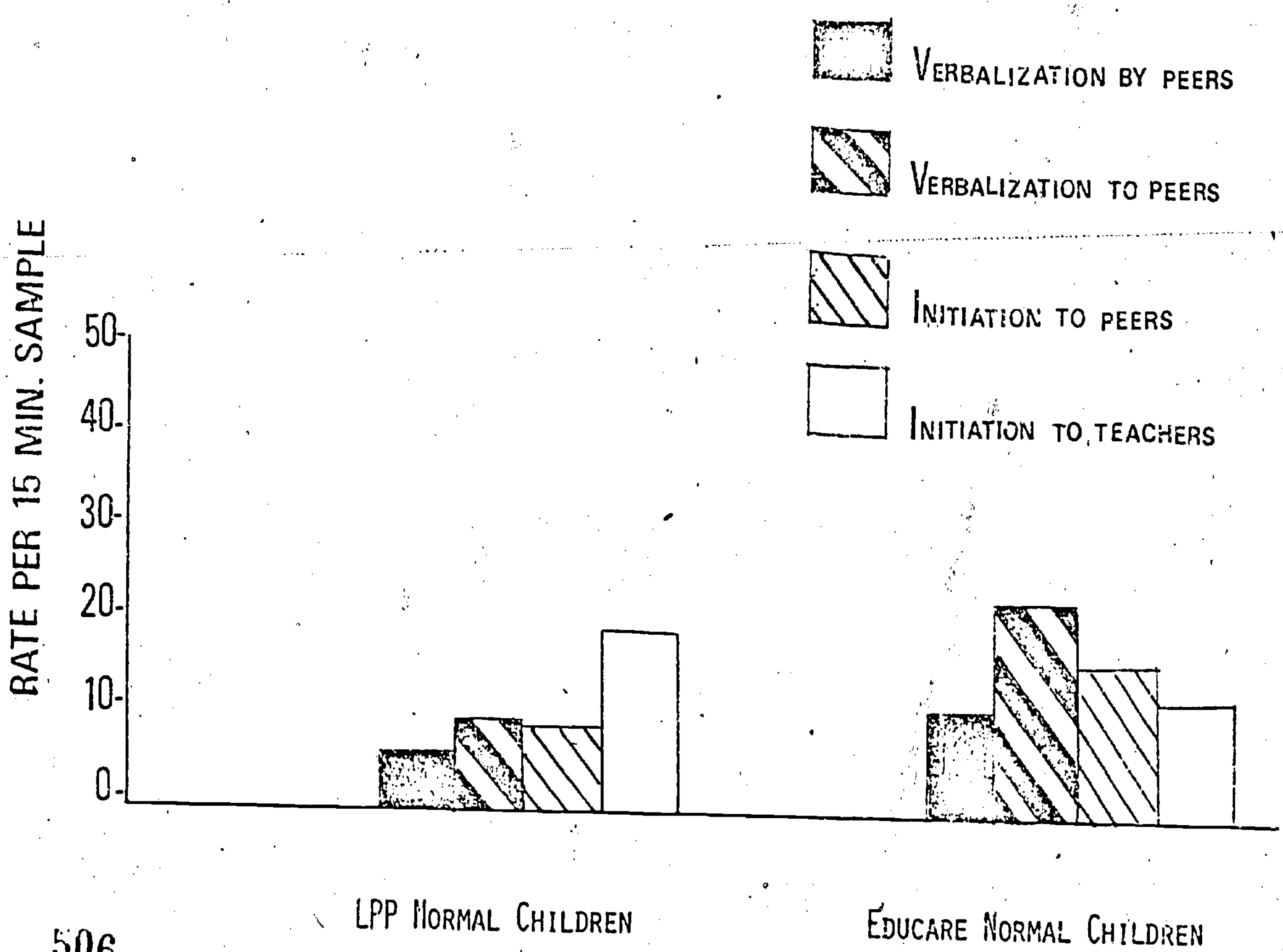
The sensity of children's speech to classroom context has implications for mainstreaming models as well as for the planning of interventions. From these findings, it is demonstrated that a language delayed child placed in a classroom with normal children is exposed to a normal level of verbal stimulation. This situation may help the child acquire verbal skills. Conversely, these data suggest that placing a normal child in a classroom for language delayed children will decrease verbal stimulation and may result in a depressed rate of verbal interaction with peers.

| SETTING | AGES AND NUMBER OF CHILDREN | NUMBER OF ADULTS | FREEPLAY ACTIVITIES |
|---|---|---|---|
| HILLTOP I (…Y CARE CENTER) | 10-15 TWO AND A HALF YEAR OLDS | 2-3 | TABLE ACTIVITIES DRAMATIC PLAY IN A HOUSE |
| HILLTOP II (…Y CARE CENTER) | 12-17 THREE AND A HALF YEAR OLDS | 2-3 | TABLE ACTIVITIES |
| HAWORTH (…IVERSITY CHILD …EVELOPMENT …BORATORY) | 10-12 THREE, FOUR, AND FIVE YEAR OLDS | 1-3 | CHOICE OF THREE VARYING PLAY ACTIVITIES |
| …NGUAGE PROJECT PRESCHOOL (…PERIMENTAL …ESCHOOL) | 8-9 THREE, FOUR, AND FIVE YEAR OLDS | 3-4 | CHOICE OF TWO VARYING PLAY ACTIVITIES |
| …UCARE (…IVERSITY DAY …RE CENTER) | 10-15 THREE, FOUR, AND FIVE YEAR OLDS | 2-3 | CHOICE OF THREE VARYING PLAY ACTIVITIES |

Peer and Teacher Directed Verbalizations



Peer Interaction of Normal Children

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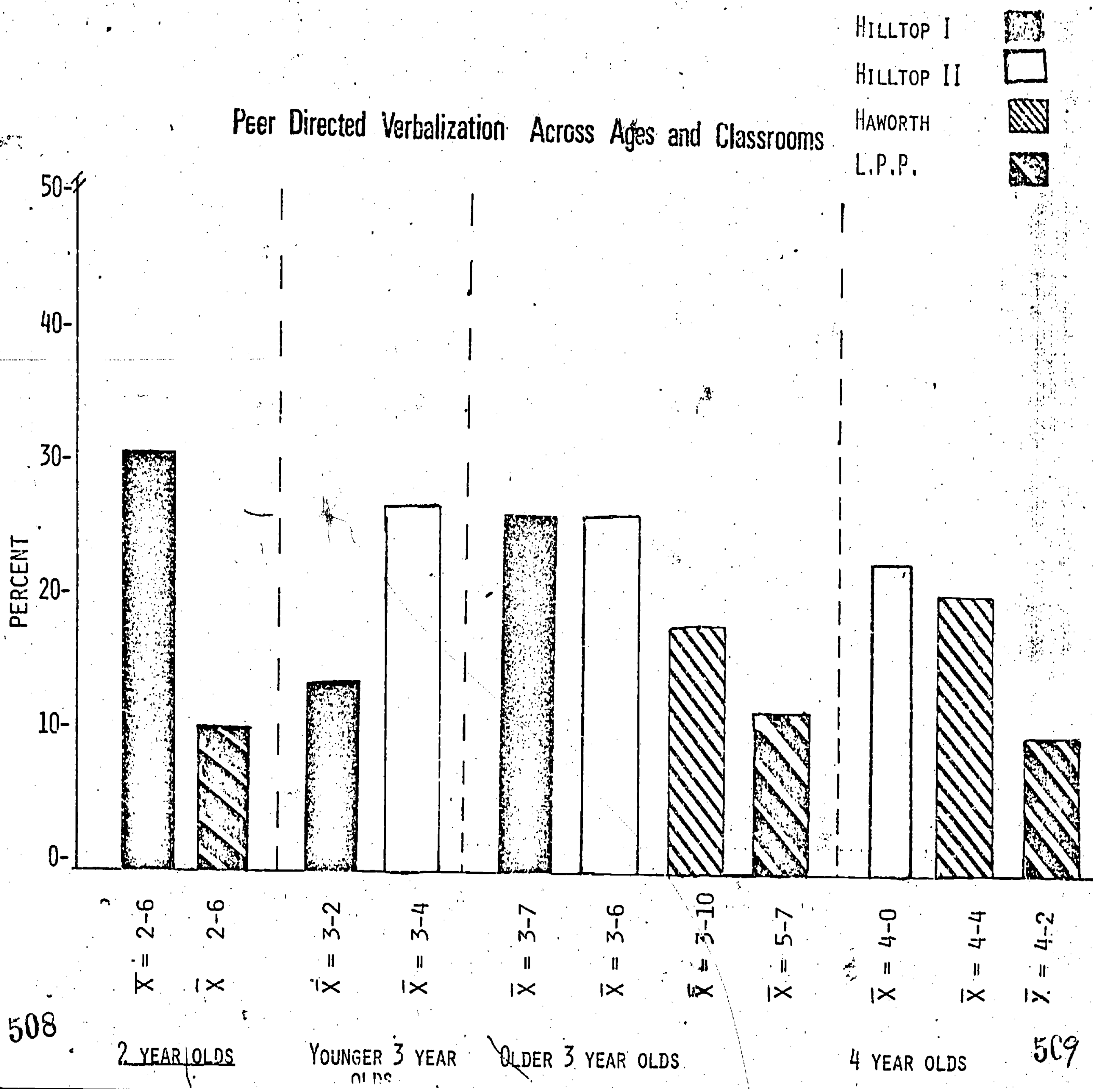
507


Peer Directed Verbalization Across Ages and Classrooms
HILLTOP I
HILLTOP II
HAWORTH
L.P.P.
PERCENT
50
40
30
20
10
0
X̄ = 2-6
X̄ = 2-6
X̄ = 3-2
X̄ = 3-4
X̄ = 3-7
X̄ = 3-6
X̄ = 3-10
X̄ = 5-7
X̄ = 4-0
X̄ = 4-4
X̄ = 4-2
2 YEAR OLDS
YOUNGER 3 YEAR OLDS
OLDER 3 YEAR OLDS
4 YEAR OLDS

A Comparative Analysis of Communication Between
Normal and Language Delayed Children

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The identity and characteristics of the speaker and the listener are critical in conversational interactions. The interpersonal communication process is sensitive to the context in which it occurs and the people involved are a major aspect of context. The kind and quantity of verbal behavior displayed by a speaker varies depending upon who is functioning as the listener. In this study, the social-functional aspects of preschoolers' language were compared across a series of interpersonal contexts. Language skill of the children was judged as age appropriate or as delayed.

Method:

Seven preschool children participated in the study. A total of 164 ten-minute dyadic play sessions were audio recorded and transcribed. Dyadic interactions occurred in the following interpersonal contexts: (1) two normal children, (2) two language delayed children, (3) one normal child and one language delayed child. Behaviors categorized as seeking and providing information (questions, content relevant utterances), recruitment of the listener's attention (nonverbal attention, attentional utterances, distance), and reinforcing the speaker (contingent verbalizations, listener responses, length of conversational turn) were compared during baseline, an intervention to increase rates of talking, and an intervention to teach particular conversational skills.

Results and Discussion:

Interactions between normal children were characterized by high rates of behavior in all three social-functional categories of behavior. Conversations between normal and language delayed children resulted in high rates of behavior categorized as recruitment of the listener's attention, particularly for the language delayed children. The most significant changes in behavior resulted from the skill teaching (questions, attention, contingent responses). The rates of content relevant utterances, attentional utterances, nonverbal attention and contingent responses increased in conversations between normal and language delayed children. Comparison with normal conversationalists presented a favorable evaluation of the intervention, i.e., language delayed children behaved more like normal children.

Table 1

Interpersonal Contexts

| | | Speaker: Normal | Speaker: Language Delayed |
|---|---|---|---|
| Listener | Normal | X | X |
| Listener | Language Delayed | X | X |

Table 2

Number of Sessions

CONDITIONS

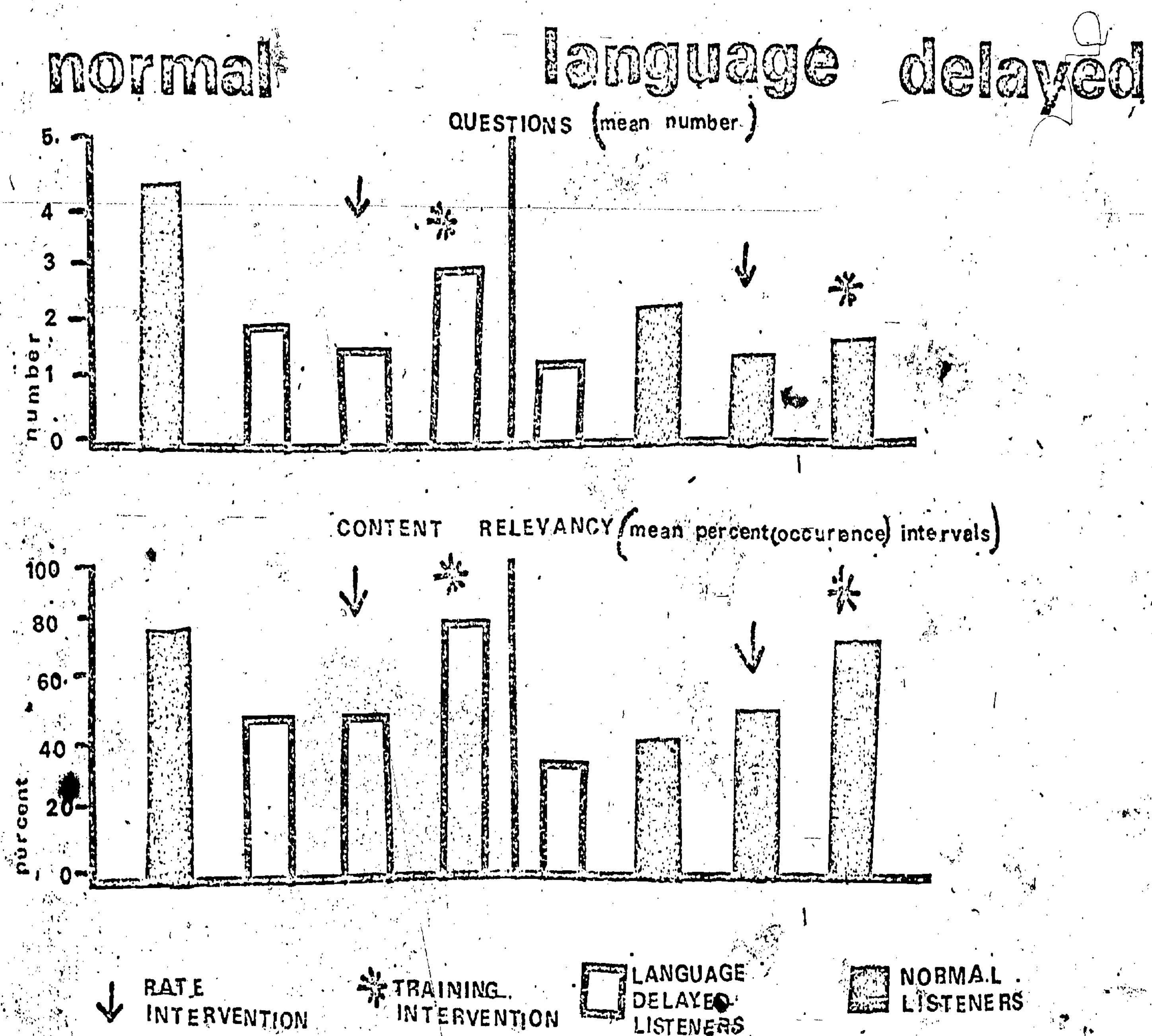
| CONTEXTS | Baseline | Rate Intervention | Skill Intervention |
| --- | --- | --- | --- |
| Normal-Normal | | | |
| J.P. | 10 | --- | --- |
| B.W. | 9 | --- | --- |
| B.B. | 8 | --- | --- |
| Normal-Language Delayed | | | |
| J.P. | 15 | 8 | 44 |
| B.W. | 14 | 13 | 25 |
| B.B. | 18 | 3 | --- |
| Language Delayed-Normal | | | |
| M.H. | 13 | --- | --- |
| D.P. | 17 | 8 | 44 |
| W.B. | 11 | 13 | --- |
| D.H. | 15 | 3 | 25 |
| Language Delayed-Language Delayed | | | |
| M.H. | 17 | --- | --- |
| D.P. | 9 | --- | --- |
| W.B. | 11 | --- | --- |
| D.H. | 7 | --- | --- |

Table 3

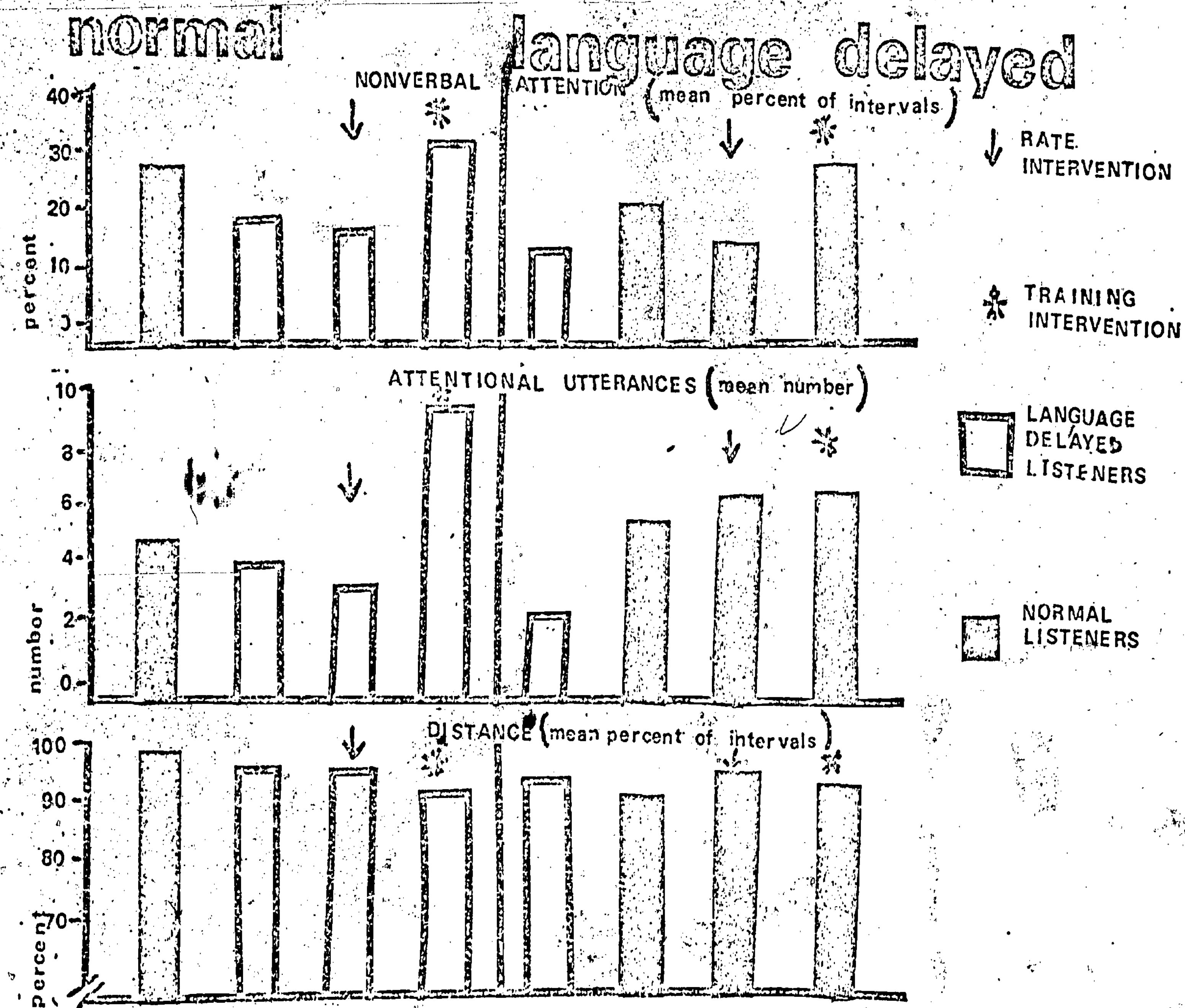
Social-Functional Categories

| |
|---|
| 1. Seeking and providing information |
| direct questions<br>clarification questions<br>relevancy of content |
| 2. Recruitment of listener's attention |
| nonverbal behavior<br>attentional utterances<br>distance |
| 3. Reinforcement of the speaker |
| contingent responses<br>listener responses<br>mean length of conversational turn |

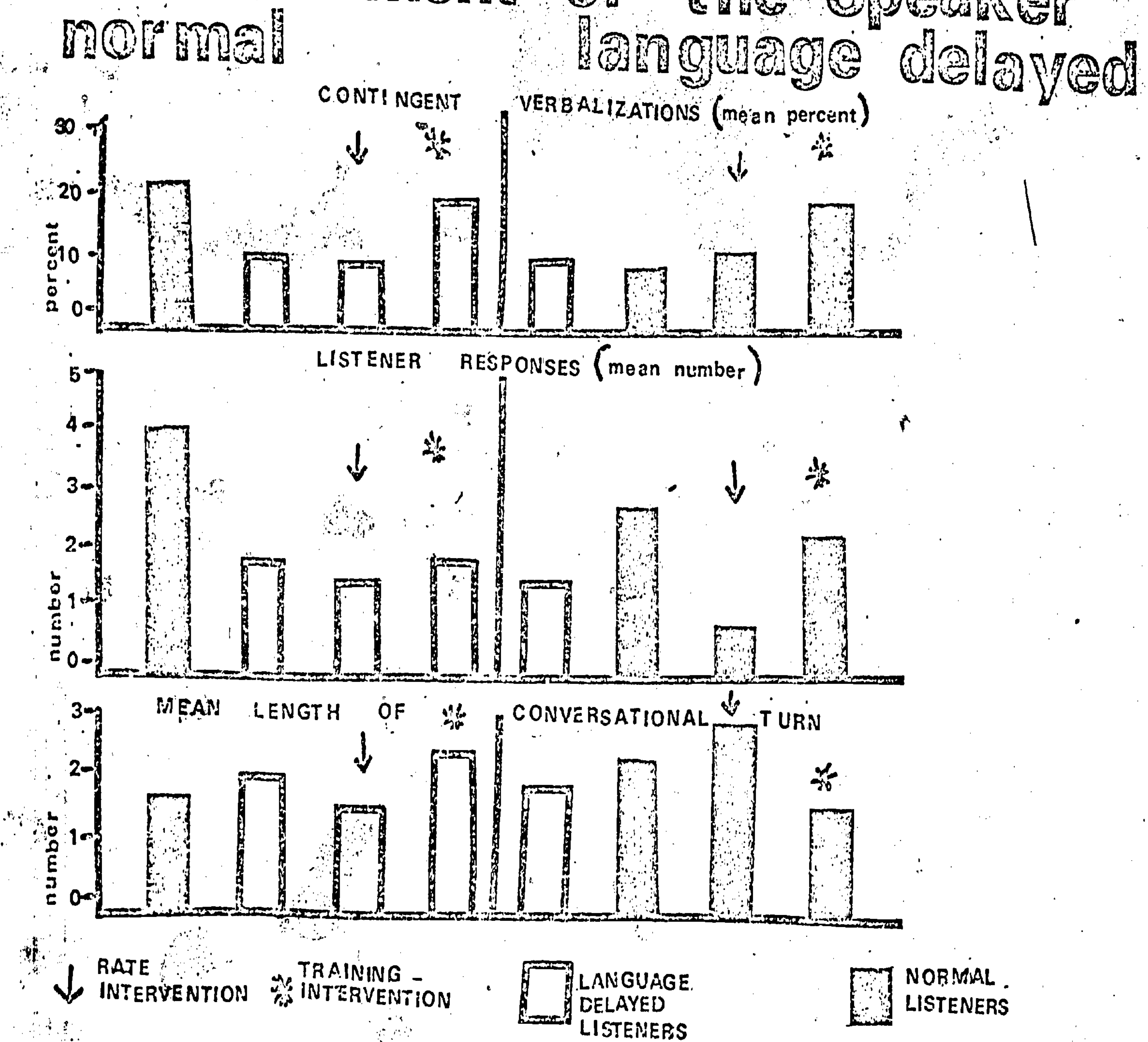
# Seeking and Providing Information



# Recruitment of Listener's Attention



# Reinforcement of the Speaker



## Seeking and Providing Information

| Child | Questions[1] | | | | | | | | Content Relevancy[2] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Normal Speaker | | | | L.D. Speaker | | | | Normal Speaker | | | | L.D. Speaker | | | |
| | Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate | Normal - train | Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate | Normal - train |
| P. | 5.11 | .47 | 1.25 | 3.25 | | | | | 77 | 22 | 21 | 62 | | | | |
| W. | 4.56 | 2.14 | 1.5 | 5.5 | | | | | 73 | 62 | 80 | 95 | | | | |
| B. | 2.88 | 2.94 | | | | | | | 77 | 66 | | | | | | |
| B. | | | | | 2.18 | 2.23 | 1.9 | 2.8 | | | | | 47 | 42 | 70 | 84 |
| P. | | | | | .55 | 1.74 | .88 | .50 | | | | | 33 | 39 | 33 | 63 |
| M. | | | | | 1.29 | 4.31 | | | | | | | 42 | 57 | | |
| M. | | | | | 1.0 | .36 | | | | | | | 16 | 33 | | |

[1]Mean number in a 10-min session

[2]Mean percent of (occurrence) intervals in a 5-min observation

Reinforcement of the Speaker

| Contingent Responses[1] | | | | | | | |
|---|---|---|---|---|---|---|---|
| Normal Speaker | | | | L.D. Speaker | | | |
| Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate | Normal - train |
| 18 | 6 | 3 | 16 | | | | |
| 26 | 11 | 16 | 36 | | | | |
| 26 | 13 | | | | | | |
| | | | | 11 | 8 | 18 | 22 |
| | | | | 11 | 10 | 4 | 17 |
| | | | | 12 | 14 | | |
| | | | | 2 | 3 | | |

| Listener Responses[2] | | | | | | | |
|---|---|---|---|---|---|---|---|
| Normal Speaker | | | | L.D. Speaker | | | |
| Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate | Normal - train |
| 4.11 | .80 | .50 | .30 | | | | |
| 4.33 | 1.93 | 2.5 | 3.3 | | | | |
| 3.88 | 2.56 | | | | | | |
| | | | | 1.55 | 2.08 | .92 | 3.2 |
| | | | | 1.89 | 2.05 | .75 | 1.4 |
| | | | | 2.24 | 7.23 | | |
| | | | | .14 | .07 | | |

| Mean Length of Conversational Turn | | | | | | | |
|---|---|---|---|---|---|---|---|
| Normal Speaker | | | | L.D. Speaker | | | |
| Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate | Normal - train |
| 2.03 | 1.78 | 1.44 | 3.13 | | | | |
| 1.82 | 2.4 | 1.9 | 1.8 | | | | |
| 1.56 | 2.3 | | | | | | |
| | | | | 2.15 | 4.03 | 2.5 | 1.8 |
| | | | | 1.94 | 1.83 | 4.16 | 1.5 |
| | | | | 1.68 | 2.36 | | |
| | | | | 2.22 | 1.9 | | |

[1] Mean percent of all verbalizations in a 10-min session.

[2] Mean number in a 10-min session.

Recruitment of Listener's Attention

| Child | Non-Verbal Attention[1] (looking) | | | | | | | | Attentional Utterances[2] | | | | | | | | Distance[1] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Normal Speaker | | | | L.D. Speaker | | | | Normal Speaker | | | | L.D. Speaker | | | | Normal Speaker | | | | L.D. Speake | | |
| | Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate | Normal - train | Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate | Normal - train | Normal | L.D. | L.D. - rate | L.D. - train | L.D. | Normal | Normal - rate |
| .P. | 19 | 15 | 14 | 28 | | | | | 2.22 | .53 | 2.4 | 8.2 | | | | | 99 | 93 | 92 | 91 | | | |
| .W. | 23 | 19 | 21 | 36 | | | | | 3.0 | 8.86 | 4.4 | 10.5 | | | | | 98 | 98 | 100 | 95 | | | |
| .B. | 43 | 24 | | | | | | | 5.25 | 3.44 | | | | | | | 99 | 93 | | | | | |
| .B. | | | | | 13 | 24 | 21 | 30 | | | | | 4.0 | 7.15 | 5.3 | 11.5 | | | | | 95 | 90 | 100 |
| .P. | | | | | 20 | 21 | 11 | 28 | | | | | 1.11 | 3.32 | 7.63 | 1.68 | | | | | 99 | 91 | 92 |
| .H. | | | | | 19 | 37 | | | | | | | 3.18 | 10.38 | | | | | | | 91 | 93 | |
| .H. | | | | | 5 | 10 | | | | | | | 1.14 | 1.43 | | | | | | | 93 | 95 | |

[1] Mean percent of intervals in a 5-min observation

[2] Mean number in a 10-min session

# The Form and Function of Questions in Child-Child Conversation

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Language Project Preschool

University of Kansas

In the present investigation, question-asking skill was analyzed in free play sessions involving pairs of normal and language delayed preschoolers. The literature on adult-child verbal interaction indicates that adults frequently ask children questions. It has been suggested (Lewis, 1976; Snow, 1977) that adults ask questions as sort of a dialogic tutoring device. It is possible that children, too, use this strategy when talking to their peers. Questions are a useful response-eliciting device. The turn-taking structure of discourse if inherent in question-answer sequences. Question asking and answering can be one indicator of communicative and conversational skill. Questions can serve a variety of functions (e.g., requesting, reporting, seeking clarification, game playing) which are important in the maintainence of conversation.

A comparison of the form, function and effect of questions asked by normal children with those asked by language delayed children is useful to identify deficiencies in delayed children's use of language. Language learning is more than a lexical, syntactical and semantic task. It involves learning how to use language in social contexts.

Method:

Subjects - Eleven children, ranging in age from 2-8 to 5-0, participated in the study. The children were enrolled in either a daycare center or a special preschool classroom for children with delayed language acquisition. Table 1 provides age and classroom enrollment information for each child.

Setting - Conversations were tape-recorded while a pair of children played together in a room outside of the classroom. An adult was present but did not participate in the interaction.

## Procedure

Conversational Contexts - Twenty 10-minute conversations were recorded in each of the following contexts:

1. two normal children talking together
2. two language delayed children talking together
3. one normal and one language delayed child talking together
4. one normal and one language delayed child talking together who had previously received special tutoring on question asking

Analysis - Question-answer pairs were selected from verbatim transcriptions of the 80 conversations. Questions were analyzed according to the identify of the respondent, relevancy of the answer, syntactic form and communicative intention. Table 2 presents a brief description of the categories used in analysis.

A total of 6,369 utterances formed the 80 conversations. From this, 522 questions were analyzed. As shown in Table 3, normal children tended to ask the most questions of other normal children. Daycare children (mean 13.5%) asked more questions than the normal preschool children (mean 7%). However, the rate of successful questions (those receiving a relevant verbal response) was similar across the four conversational contexts. Children answered about one-third of the questions they asked themselves (i.e., egocentric responses).

As shown in Table 4, "what" questions, yes/no questions and tag questions were most frequent in the normal-normal context and in the tutored situation. Normal children also asked more "where" and "when" questions.

Most questions (65% - 78%) had a direct function and as shown in Table 5, all functions were expressed in all conversational contexts. Normal children asked almost twice as many information-seeking and reporting questions than the other children. Test/game questions were prevalent in the normal-language delayed context. Clarification questions occured more frequently when a language delayed child was involved. Question tutoring did not result in a distribution of functional use which resembled that of the normal-normal context.

| CHILD | AGE* | SETTING | LANGUAGE ABILITY |
|---|---|---|---|
| Bette | 2-8 to 2-10 | Preschool | Normal |
| June | 2-9 to 3-4 | Preschool | Normal |
| Bob | 3-5 to 4-0 | Preschool | Normal |
| Hank | 3-7 to 3-10 | Daycare | Normal |
| Gary | 3-7 to 3-10 | Daycare | Normal |
| Walt | 3-11 to 4-6 | Preschool | Delayed |
| Donny | 4-0 to 4-7 | Preschool | Delayed |
| Debby | 4-0 to 4-2 | Preschool | Delayed |
| Mark | 4-0 to 4-7 | Preschool | Delayed |
| Sue | 4-9 to 5-0 | Daycare | Normal |
| Jane | 4-9 to 5-0 | Daycare | Normal |

* age at the start and end of data collection

Table 1 - Child Characteristics

## QUESTIONS

KIND ( based on the relevancy of the answer )

successful

unsuccessful

ambiguous

FORM ( based on syntax )

Wh ( what, why, where, when, who, whose )

How

Tag

Yes/no

Intonation

FUNCTION (based on communicative intent )

Direct

clarification

request for information

request for action

confirmation

Indirect

test/game

suggestion

attention- report

## ANSWERS

KIND (based on the identity of the speaker )

social

egocentric

Table 2 - Question Analysis Categories

| CONDITION | NUMBER/PER CENT OF QUESTIONS | SUCCESSFUL QUESTIONS | UNSUCESSFUL QUESTIONS | AMBIGUOUS QUESTIONS |
|---|---|---|---|---|
| Normal-Normal | 247/11% (2,343 ) | 121/49% | 74 | 52 |
| Normal-Language Delayed | 85/7% (1,232 ) | 27/32% | 32 | 26 |
| Language Delayed-Language Delayed | 52/5% (996 ) | 19/37% | 10 | 23 |
| Question Tutoring | 138/8% (1,798) | 54/9% | 30 | 54 |

number in parentheses is total number of utterances

Table 3- Overall Quantity of Questions

| QUESTION FORM | NORMAL-NORMAL | NORMAL-LANGUAGE DELAYED | LANGUAGE DELAYED-LANGUAGE DELAYED | QUESTION TUTORING |
|---|---|---|---|---|
| Where (32) | 20 | 4 | 3 | 5 |
| When (17) | 15 | 0 | 0 | 0 |
| Why (15) | 11 | 0 | 1 | 3 |
| Who (14) | 10 | 3 | 1 | 0 |
| What (114) | 61 | 21 | 12 | 20 |
| Whose (1) | 1 | 0 | 0 | 0 |
| How (21) | 12 | 2 | 2 | 5 |
| Tag (50) | 27 | 1 | 4 | 18 |
| Yes/No (113) | 55 | 11 | 3 | 44 |
| Yes/No Elab. (2) | 0 | 0 | 1 | 1 |
| Intonation (116) | 35 | 32 | 22 | 27 |
| Unclassified (27) | 0 | 11 | 3 | 13 |

number in parentheses indicates total number

Table 4-- Question Form Distribution

| QUESTION FUNCTION | NORMAL-NORMAL | NORMAL-LANGUAGE DELAYED | LANGUAGE DELAYED-LANGUAGE DELAYED | QUESTION TRAINING |
|---|---|---|---|---|
| Direct | 172/70% | 52/65% | 38/78% | 96/70% |
| Clarification | 22/12% | 11/21% | 8/21% | 13/14% |
| Information | 124/72% | 24/46% | 18/47% | 40/41% |
| Action | 12/7% | 6/12% | 1/3% | 30/31% |
| Confirmation | 14/9% | 11/21% | 11/29% | 13/14% |
| Indirect | 75/30% | 28/35% | 11/22% | 42/30% |
| Test/Game | 14/19% | 17/61% | 3/27% | 20/48% |
| Suggestion | 20/26% | 4/14% | 5/45% | 12/28% |
| Attention/ Report | 41/55% | 7/25% | 3/27% | 10/24% |
| Unclassified | 0 | 3 | 2 | 0 |

Table 5--Question Function Distribution

Discussion:

Differential use of questions with respect to quantity, syntactic form, and communicative function were found across the four conversational contexts. The high rate of self-answered or egocentric questions seemed to point to the childrens' self-directive rather than social use of questions. Questions did not always result in the allocation of speaking turns. Functional usage of questions in general mirrored the functions described by Holzman (1972) in adult-child dialogue. The distribution of functions did show that while all children expressed all functions, the language delayed children did not use the same kinds of questions as frequently as the normal children. The rate of question asking reflected the age and linguistic competency of the child. Question tutoring did not result in making the normal-language delayed context resemble the normal-normal context in terms of question rate, form or function.

Social Language and Assembly Effects

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The sensitivity of children's social behavior to situational contexts can suggest naturalistic, simply engineered strategies to facilitate social language use.

The present investigation provided an analysis of two ways of grouping preschoolers. Homogeneous triads composed of normal children or language delayed children were compared to heterogeneous triads composed of 2 normal and one langauge delayed child. Heterogeneous groups provide for the potential social integration of nonhandicapped and mildly to moderately handicapped children. The triadic free play sessions functioned as a naturalistic intervention to promote language behavior in the language delayed children. It was assumed that the social language skills of language delayed preschoolers would be enhanced in the company of normal children. The normal children's verbal and nonverbal behavior should provide a more stimulating environment, more models of appropriate speech and more opportunities for talking. Language is a critical component of social behavior. Heterogeneous grouping of children is proposed as a means of facilitating and upgrading the social language behavior of children with delayed language development.

Methods:

Six children, ranging in age from 2 years 8 months to 3 years 9 months were subjects. All of the children were enrolled in a preschool program for language delayed children. Three children were not considered delayed and served as normal models in the classroom. The remaining children were considered langauge-delayed.

Children were videotaped while playing together in homogeneous (i.e., three nondelayed children, 3 language delayed children) or heterogeneous (2 nondelayed children, 1 language delayed child) triads. A variation of a reversal design with probes of the homogeneous condition during the heterogeneous condition was used. Videotapes were scored for: number of initiations, number of responses, who talked to whom, level of reference, requests for peer behavior and contingent responses.

Results:

The normal children talked at high rates in both homogeneous and heterogeneous groups. In contrast, the language delayed children were very quiet in the play sessions. Two of the language delayed children increased their rate of talking in the heterogeneous play group and this effect carried over into the second homogeneous condition. But, despite the composition of the play group, language delayed children did not display the same verbal skills as normal children.

Discussion:

Varied groupings of normal and language delayed children did not dramatically facilitate social langauge use by langauge delayed children. The limited results may reflect the brevity of the groupings and/or the need for more directed, obtrusive intervention.

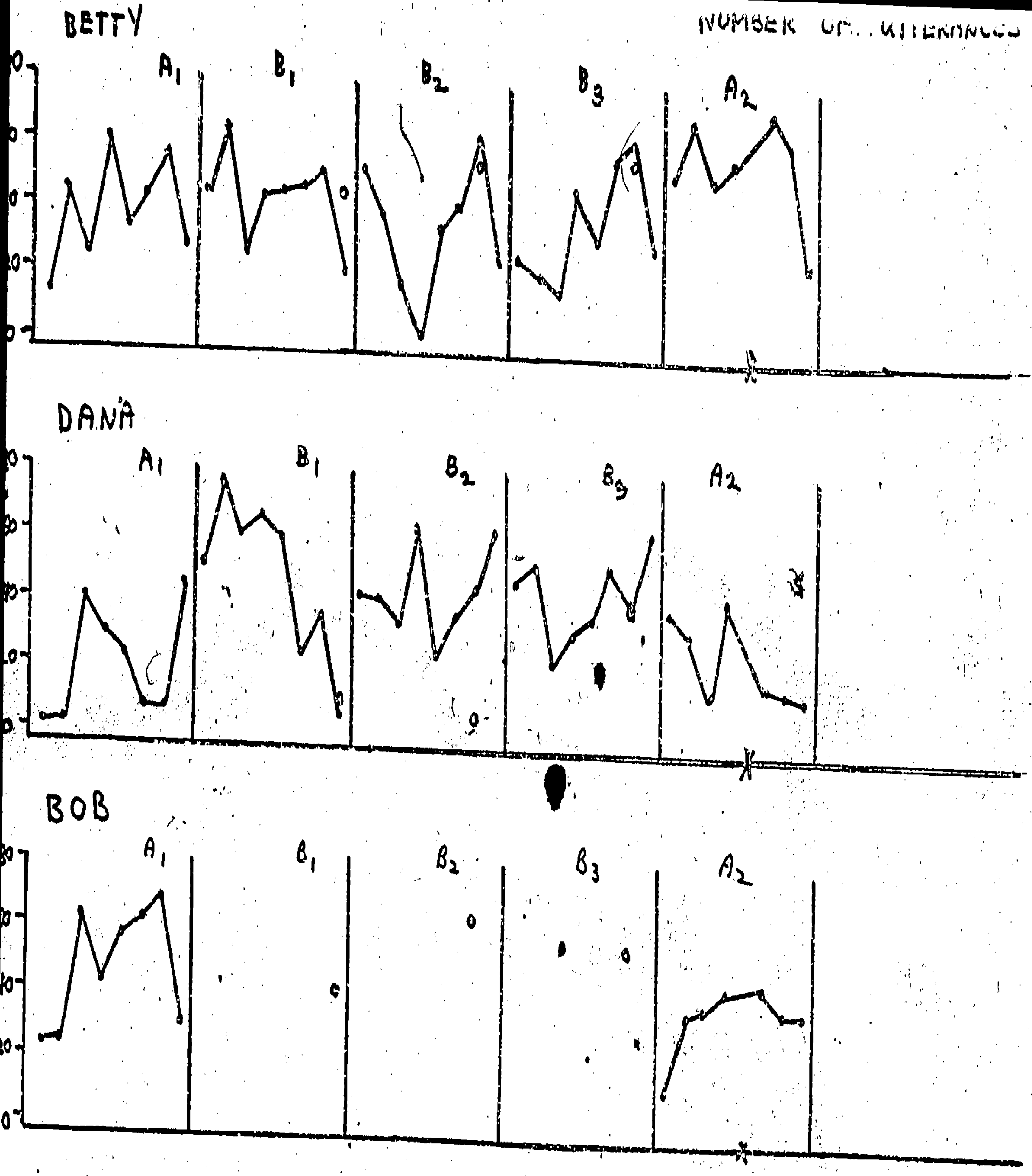
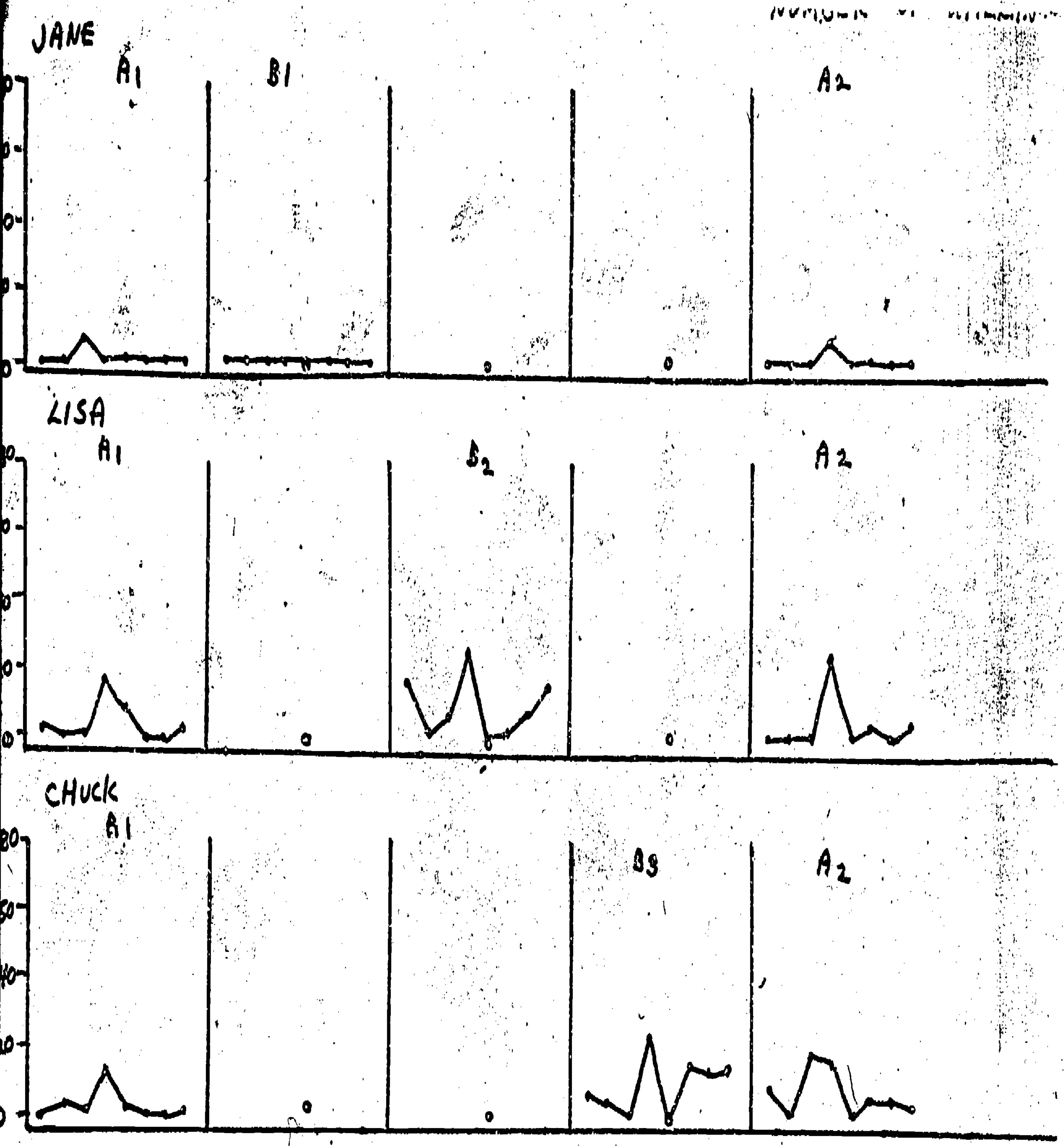

NUMBER OF UTTERANCES
BETTY
A1
B1
B2
B3
A2
DANA
A1
B1
B2
B3
A2
BOB
A1
B1
B2
B3
A2

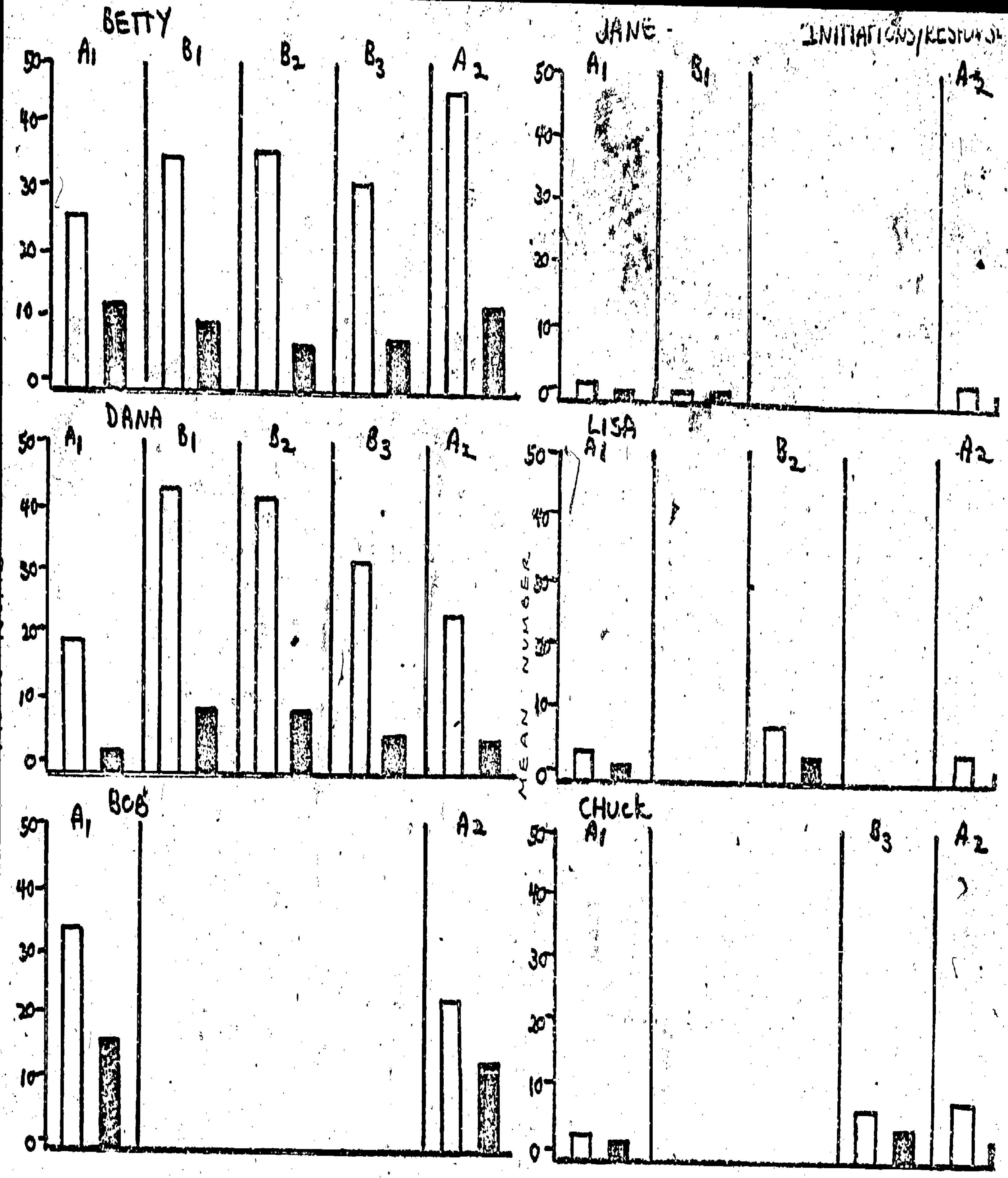
Figure 1




541

542

Figure 2

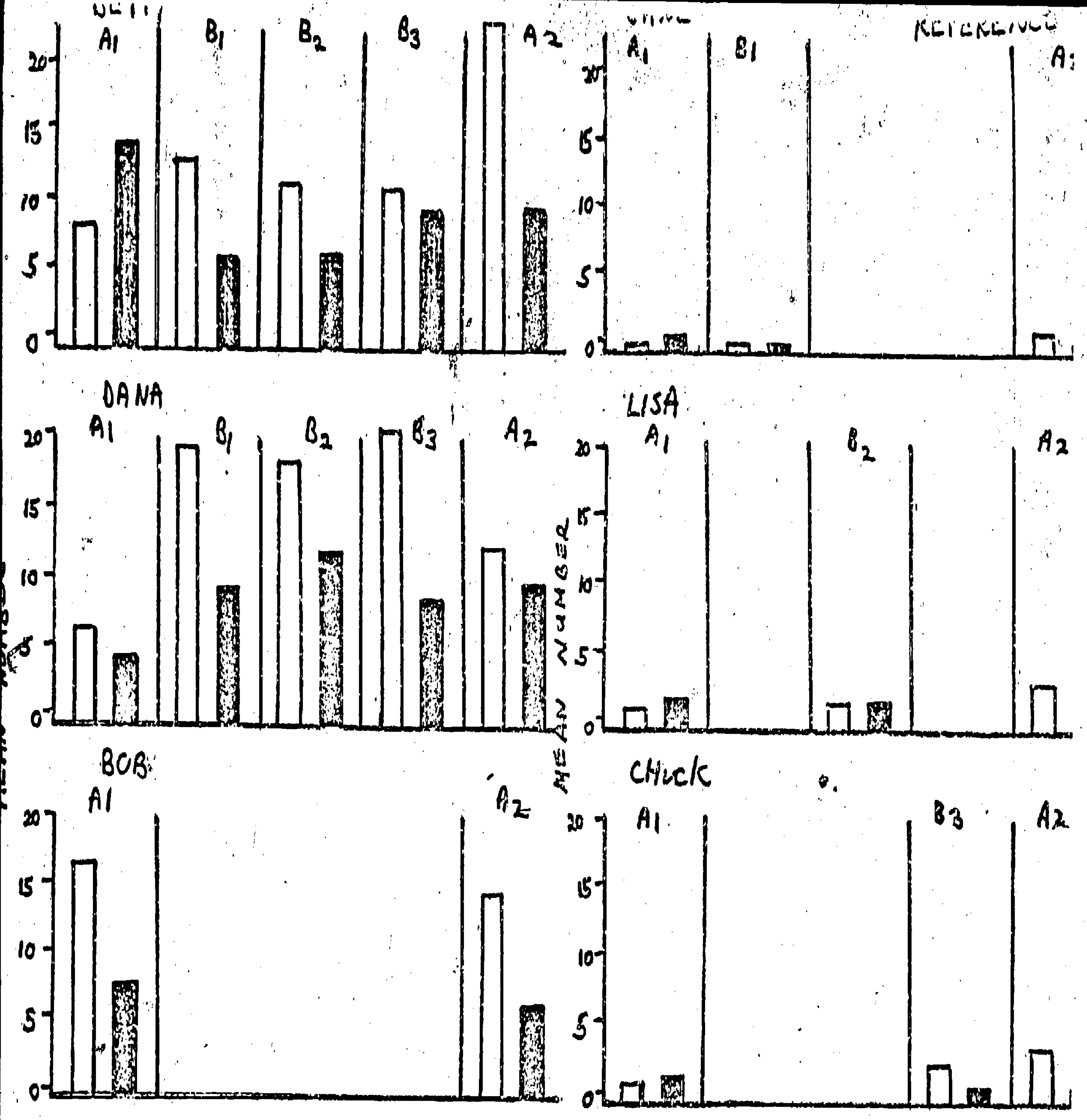



543 544

NORMAL CHILDREN

LANGUAGE DELAYED CHILDREN

Figure 3



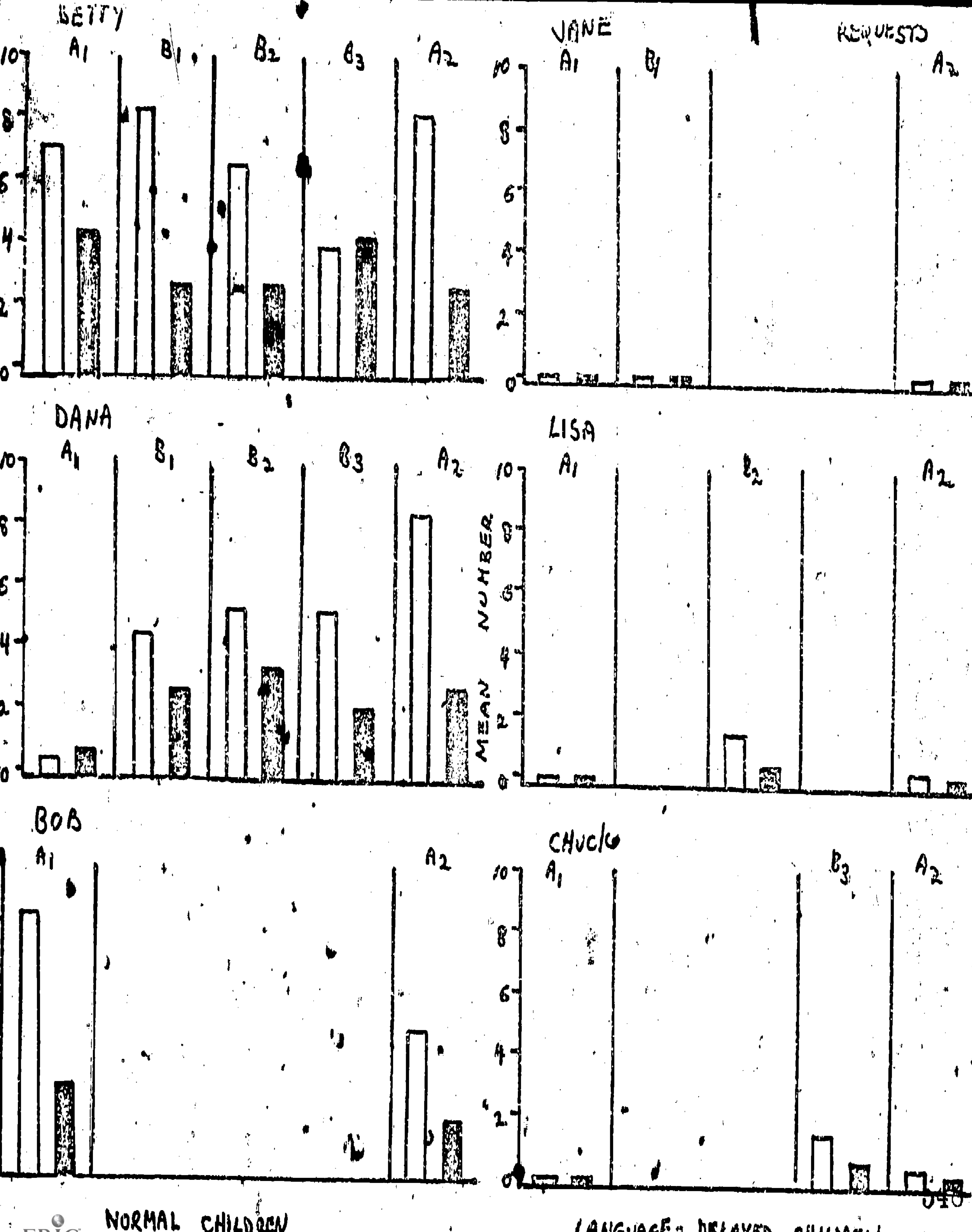

NORMAL CHILDREN

LANGUAGE DELAYED CHILDREN

545

546

☐ Self directed ▨ Other-directed



BETTY
A1 B1 B2 B3 A2
JANE
REQUESTS
A1 B1 A2
DANA
A1 B1 B2 B3 A2
LISA
A1 B2 A2
MEAN NUMBER
BOB
A1 A2
CHUCK
A1 B3 A2
NORMAL CHILDREN
LANGUAGE-DELAYED CHILDREN

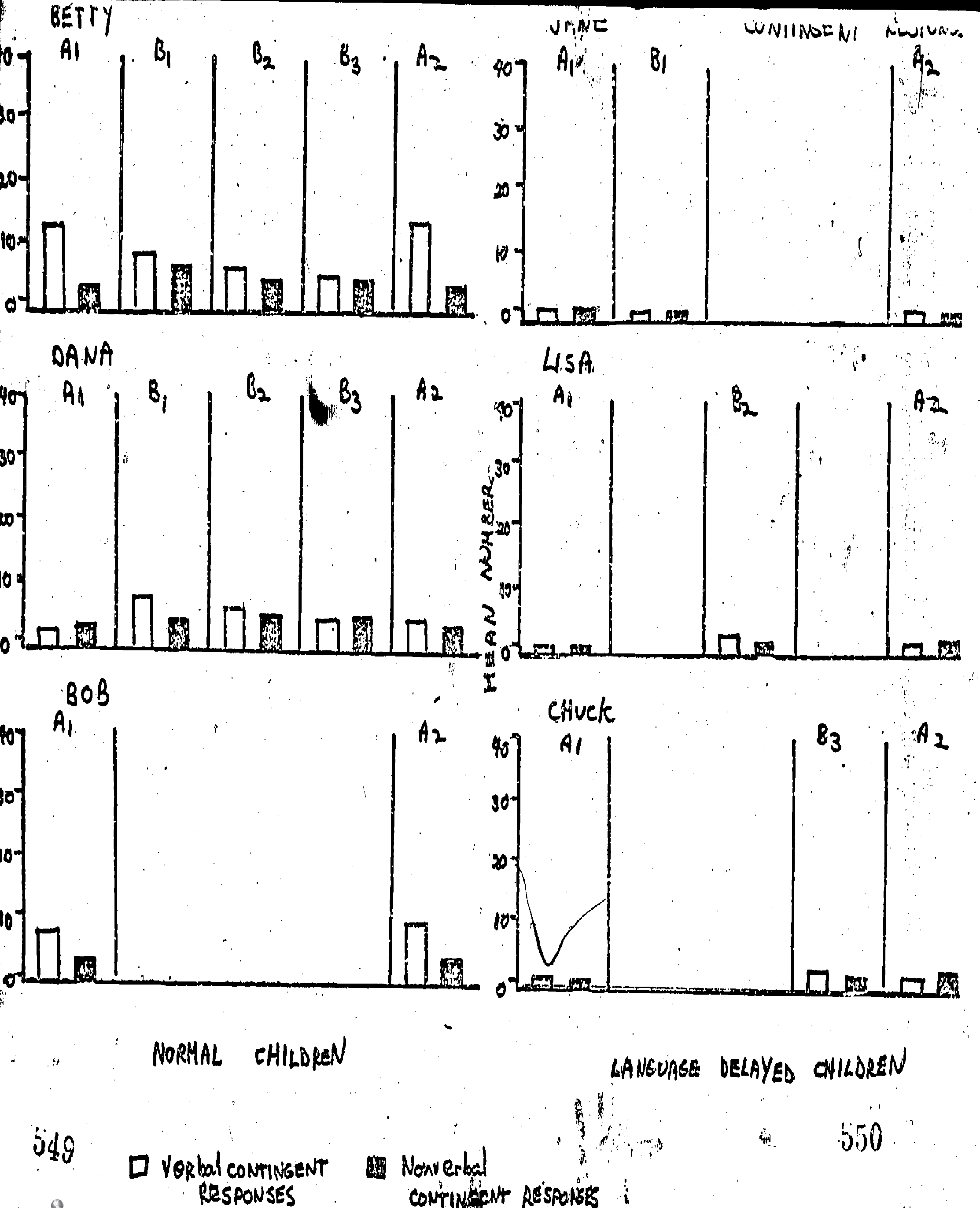

BETTY
A1
B1
B2
B3
A2
JANE
CONTINGENT RESPONSES
DANA
LISA
BOB
CHUCK
MEAN NUMBER
0
10
20
30
40
NORMAL CHILDREN
LANGUAGE DELAYED CHILDREN
Verbal CONTINGENT RESPONSES
Nonverbal CONTINGENT RESPONSES



Figure 9

Table 1: Child Characteristics

| Child | Chron. Age | P.P.V.T. (MA) | Stacl (%) | Houston (age) |
|---|---|---|---|---|
| Betty | 3-9 | 5-1 | 97 | 5+ |
| Dana | 3-8 | 5-11 | 94 | 5 |
| Bob | 2-8 | 3-11 | 94 | 5 |
| Jane | 3-4 | 3-8 | -- | 3+ |
| Lisa | 3-7 | 3-11 | 49 | 3+ |
| Chuck | 2-11 | 5-2 | 97 | 3+ |

Table 2: Experimental Design

| | A | B | | | | | | A |
|---|---|---|---|---|---|---|---|---|
| Condition: | Homogeneous | Heterogeneous | | | | | | Homogeneous |
| | | 1 | | 2 | | 3 | | |
| Group Composition | Normal Children (Betty, Dana, Bob)<br><br>Language Delayed (Jane, Lisa, Chuck) | Betty<br>Dana<br>Jane | | Betty<br>Dana<br>Lisa | | Betty<br>Dana<br>Chuck | | Normal Children (Betty, Bob, Dana)<br><br>Language Delayed (Jane, Lisa, Chuck) |
| | | Probe – Homogeneous | | | | | | |
| Time period (days) | 8 | 8 | 1 | 8 | [illegible] | [illegible] | 1 | 8 |